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MEDICAL

EXPLANATION

OF THE

ANATOMICAL ATLAS

OF

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The Seventh Part contains :—1. a Vascular and Nervous Body (Anterior View). 2. Ditto (Posterior View). 3. A Plate of the *descensus testiculorum,* and of the Abdominal and Femoral Rings. 4. A Plate of the *Pleura* and *Peritoneum.* 5. A Plate of the Nerves of the Head and Neck. 6. A Plate of General Anatomy.

The difficulty of colouring the Plates in the present Part, has been the cause of its publication being delayed, and the same also occurs with the last part; the editor, however, is happy to say that it is now completed and will be published forthwith.

The Author, in completing this Atlas, aims at producing a perfect Compendium of Anatomy, including both Particular and General Anatomy.

DESCRIPTION

OF THE

FIRST VASCULAR & NERVOUS BODY.

Observe. — *A.* denotes *Arteria,* the artery; *V. Vena,* the Vein; and *N. Nervus,* the Nerve.

I. Vessels and Nerves on the Head.

1. *A. V. et N. supraorbitalis.* 2. *A. V. et N. frontalis.* 3. *A. V. et N. nasalis.* 3^1. *A. V. et N. nasalis externus N. ethmoidei.* 4. *A. V. et N. temporalis.* 5. *A. V. et N. palpebralis superioris et* 6. *inferioris.* 7. *A. V. et N. auricularis anterior superior et* 8. *inferior.* 9. *A. V. et N. occipitalis.* 10. *Rete zygomaticum* of the *N. facialis.* 11. *Glandula parotis.* 12. *Ductus stenonianus.* 13. *A. V. et N. transversa faciei.* 14. *Rete buccale.* 15. *Rete labiale superius.* 16. *Vena facialis anterior.* 17. *A. et V. angularis nasi.* 18. *A. et V. coronaria labii superioris et* 19. *inferioris.* 20. *N. subcutaneus maxillae inferioris* of the *N. facialis.*

II. Vessels and Nerves on the Neck.

a. Ramus auricularis et b. R. subcutaneus colli of the *III. Nervus cervicalis. c. c. c. c. N. suprascapulares et supraclaviculares* from *III.* and *IV. Nervus cervicalis. d.d. Vena jugularis externa* mostly covered by the *Musculus subcutaneus. e. e.* Another internal and principal venous trunk of the neck. *f. Art. thyreoidea superior. g. A. transversa colli et cervicis.*

III. The Vessels and Nerves of the Upper Extremities.

1.1.1.1.1. *Vena cephalica.* 2.2,2.2. *V. basilica.* 3.3. *V. mediana.* 4.4.4. Two *Venae brachiales.* 5.5.5.5.5. Expansion of the *Nervus cutaneus externus.* 6. *N. cutaneus internus major.* 7. *N. cutaneus internus minor.* 8. *N. medianus.* 8^1. 8^2. 8^3. *Rami digitales communes N. mediani.* 9. *N. ulnaris.* 9^2. *N. digitalis communis Rami volaris superficialis N. ulnaris.* 9^3. *Ramus anastomoticus.* 9^1. *R. digitalis ulnaris digiti minimi.* 10. 10. 10, *Ramus superficialis N. radialis.* 11. *A. axillaris.* 12. *A. thoracica prima.* 13. *A. acromialis.* 14. *A. thoracica secunda.* 15. *A. thoracica tertia seu mammaria externa.* 16. *A. subscapularis.* 17. *A. circumflexa scapulae.* 18. *A. circumflexa humeri anterior, et* 19. *posterior.* 20. *A. brachialis.* 21. *A. collateralis ulnaris.* 22. *A. et V. radialis.* 23. *A. recurrens radialis.* 24. *A. et V. ulnaris.* 25. *Ramus volaris superficialis A. radialis.* 26. *Ramus volaris superficialis A. ulnaris.* 27. *Arcus arteriosus, venosus et nervosus volaris superficialis.* 28. *Rami digitales communes.* 28^1. *R. digitalis ulnaris seu proprius digiti minimi.* 19. *A. et V. digitales radiales.* 30. *A. et V. digitales ulnares.*

IV. The Vessels and Nerves of the Chest and Belly.

a. a. a. Rami perforantes et cutanei from the *A. et V. thoracica prima et tertia. b. b. b. b. Rami perforantes seu cutanei* from the *A. et V. mammaria interna* and from the *N. intercostales. c. c. c. c. c. A. V. et N. intercostales et lumbales.* The expansion and numerous anastomoses of these vessels and nerves are sufficiently clear without farther description. *d. A. et V. abdominalis Halleri. e. e. Rami* *perforantes* of the *A. epigastrica.* *f.* Branches of the *A. epigastrica* on the *Mus. cremaster* and spermatic cord. *g. N. spermaticus externus. h. N. ileo-inguinalis. i. N. lumbo-inguinalis. k. k. N. cutaneus femoris externus. A.* Cutaneous Venous *Plexus* of the breast and the belly.

V. The Vessels and Nerves of the Lower Extremities.

1. *A. V. et N. cruralis.* 2. *Truncus communis* of the 3. *A. circumflexa ilei externa et* 4. of the *A. abdominalis Halleri.* 5. *A. et V. spermaticae externae.* 6. *A. circumflexa femoris externa.* 7. *A. profunda femoris.* 8. *A. circumflexa femoris interna.* 9. *Vena saphena magna et N. saphenus.* 10. *N. cutaneus medius.* 11. *N. cutaneus femoris internus.* 12. *A. et V. articularis externa superior genu,* 13. *externa inferior,* 14. *interna superior,* 15. *interna inferior.* 16. *A. tibialis antica.* 17. *A. et V. recurrens genu.* 18. *A. malleolaris externa et* 19. *interna.* 20. *N. peroneus superficialis.* 21. 22. *A. V. et Nervi digitales communes, tibiales et peronei.* 23. *A. V. et N. tibialis posticus.* 24. *A. V. et N. plantaris externus.* 25. *A. V. et N. plantaris internus.*

VI. The Vessels and Nerves of the Penis.

a. Venae dorsales penis. b. A. dorsales penis. c. Nervi dorsales penis.

TWENTY-NINTH PLATE.*

Fig. I.

Shows the Arteries of the Head and Neck.

I. Arteria carotis communis. II. A. carotis externa seu facialis. 1. *A. thyreoidea superior.* 2. *Ramus laryngeus superior.* 3. *A. lingualis.* 4. *R. hyoideus.* 5. *A. maxillaris externa.* 6. *R. submentalis.* 7. *A. coronaria labii inferioris et* 8. *superioris,* 9. *A. nasalis lateralis seu angularis nasi.* 10. *R. septi nasi.* 11. *A. pharyngea adscendens.* 12. *A. occipitalis.* 13. *A. transversa faciei.* 14. *R. ad musculum orbicularem palpebrarum, zygomaticum majorem et minorem.* 15. *A. temporalis.* 16. *A. auricularis anterior inferior.* 17. *A. auricularis anterior inferior.* 18. *R. temporalis anterior.* 19. *R. temporalis medius.* 20. *R. temporalis posterior.* 21. *R. frontalis.* 22. *A. dorsalis nasi ex A. ophthalmica.*

III. Arteria carotis interna seu cerebralis.

IV. Arteria subclavia. 23. *A. transversa scapulae.* 24. *A. transversa colli.* 25. *A. cervicalis superficialis s. transversa cervicis.* 26. *R. arteriae cervicalis ascendentis* *V. A. axillaris.*

Fig. II.

Shews the External Carotid and the Subclavian Arteries with their Branches.

I. II. III. IV. 1. 2. 3. 4. 5. 6. 7. 8. 11. 12. *d. e. f.* are already described in the preceding Figure.

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* From Tiedmann's *Abbildungen der Pulsadern.*

2. *Arteria palatina ascendens.* 10. *A. tonsillaris.* 13. *R. profundus arteriae occipitalis.* 14. *R. superficiales a. o.* 15. *A. stylomastoidea.* 16. *A. auricularis posterior.* 17. *A. transversa faciei.* 18. *R. ad musculum orbicularem palpebrarum et musculos zygomaticos.*

a. A. mammaria interna. a^1. *Ramuli externi arteriae mammariae internae. b. A. thyreoidea inferior. c. A. cervicalis ascendens. g. A. vertebralis. h. A. thoracica suprema seu prima. i. A. thoracica secunda. k. R. acromialis. l. R. deltoideus. m. A. thoracica tertia seu mammaria externa. n. A. subscapularis. o. A. circumflexa scapulae. p. A. circumflexa humeri anterior. g. A. circumflexa humeri posterior.*

V. Arteria axillaris.

THIRTIETH PLATE.

Exhibits the further Course of the Internal Maxillary, the Lingual, the Vertebral and the Internal Carotid or Brain Artery.*

Fig. I.

Shows the Course of the Internal Maxillary Artery.

1. *Arteria maxillaris externa.* 2. *A. coronaria labii inferioris.* 3. *A. coronaria labii superioris.* 4. *A. angularis nasi.* 5. *A. alveolaris inferior.* 6. *Truncus arteriae carotidis externae.* 7. *A. auricularis anterior inferior.* 8. *A. temporalis.* 9. *A. meningea media,* middle artery of the *dura mater.* 10. Ramification of the *A. meningea* on the *dura mater,* after it has passed through the *Foramen spinosum* of the Sphenoid Bone. 11. *A. tympanica.* 12. *A. temporalis profunda prima s. posterior s. superficialis.* 13. *A. temporalis profunda secunda s. anterior, s. profunda.* 14. *A. alveolaris superior.* 15. *A infraorbitalis.* 16. *A. sphenopalatina s. nasalis posterior.* 17. *A. pterygopalatina, seu palatina superior, s. descendens* 18. *A. dorsalis nasi.* 19. *A. carotis interna.*

Fig. II.

Shows the Course of the Lingual, and ascending Palatine Arteries, and the Artery of the Septum of the Nose.

1. *Arteria carotis communis.* 2. *A, carotis interna.* 3. *A. carotis externa.* 4. *A. thyreoidea superior.* 5. *A. laryngea superior.* 6. *A. lingualis.* 7. *Ramus hyoideus.* 8. *R.*

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* Fig. I. II. III. are from Tiedemann's *Abbildungen der Pulsadern.* Fig. IV. V. and VI. are recently copied from nature.

dorsalis linguae. 9. *R. sublingualis.* 10. *R. profundus seu A. ranina.* 11. *A. pterygoidea.* 12. *Ramus. A. sphenopalatinae ad septum narium.* 13, *Ramulus ejusdem per canalem incisivum ad palatum mollem.* 14. *Arteriae ethmoidales ex ophthalmica.*

Fig. III.

Shews the Course of the Vertebral and Deep Cervical Arteries.

1. *Truncus anonymus.* 2. *A. carotis communis.* 3. *A. subclavia.* 4. *A. thyreoidea inferior.* 5. *Truncus communis A. cervicalis adscendentis, A. transversae scapulae et A. t. colli.* 6. *A. vertebralis,* with its branches to the Spinal Column, and in the Spinal Canal to the Oblong Marrow. 7. *Truncus A. intercostalis superioris et cervicalis profundae.* 8. *A. intercostalis superior seu prima.* 9. *A. cervicalis profundae.* 10. *A. mammaria interna.*

Fig. IV.

The Arteries at the Base of the Brain.

1. *Arteria vertebralis.* 2. *A. spinales anteriores.* 3. *A. cerebelli inferiores posteriores.* 4. *A. basilaris.* 5. *A. cerebelli inferiores anteriores.* 6. 6. *A. auris internae.* On the right side of the Brain this vessel arises from the *A. vertebralis.* 7. *A. cerebelli superiores posteriores.* 8. *A. cerebelli superiores anteriores.* 9. *A. profundae cerebri.* a. *Rami anastomotici seu communicantes cum arteria carotide interna.* 10. *A. carotides internae seu cerebrales.* 11. *A. chorioideae.* 12. *A. transversa seu fossae Sylvii.* 13. *A. corporis callosi.* b. *Ramus communicans.*

Fig. V.

The Arteries of the Brain on the Upper Surface.

The Hemispheres are somewhat separated, in order to see how the *A. corporis callosi,* coming from the base, passes around the knee of the *Corpus callosum,* spreads on its upper surface, and on the inner surface of the Hemispheres of the Cerebrum, and then descends upon the hind part of the *Corpus callosum* to pass beneath the *Fornix* and to expand in the *Plexus chorioideus medius et lateralis.*

1. 2. *A. corporis callosi.* 3. Where it bends around. 4. Branches of the *Arteria profunda cerebri.* 5. Branches of the *Arteria fossae Sylvii.* 6. *A. cerebelli superiores.*

Fig. VI.

Shews the Course of the *Arteriae chorioideae* and of the *A. corporis callosi* in the Lateral Ventricles.

a. Plexus chorioideus lateralis. b. Plexus chorioideus medius. 1. *Arteria chorioidea,* as it ascends in the middle horn of the lateral ventricle and expands like a net, together with the branches 2. which ascend from the *Arteria profunda cerebri* and anastomose with branches 3. of the *A. corporis callosi.* 4. *A. corporis callosi,* 5. its continuation, which passes backwards around the *Corpus callosum* and 6. its expansion in the *Plexus chorioideus medius.* c. Anterior pillar of the *Fornix.* 7. *A. cerebelli superiores.* 8. *A. spinales anteriores.*

THIRTY-FIRST PLATE.*

Fig. I. II.

Exhibits a View of the Pelvic Artery in a Male.

Fig. I. The branchings of the arteries are seen in a vertical section of the Pelvis; the Bladder and Rectum being turned out.

1. 2. The two lowest Lumbar Vertebrae. 3. The Intervertebral Ligaments. 4. The five pieces of the body of the *os sacrum*. 5. Those of the *ossa coccygis*. 6. *Symphysis ossium pubis*. 7. *Musculus opisthodenar*. 8. *Gluteus maximus*. 9. 10. *M. transversus. Rectus abdominis*. 11. *M. iliacus internus*. 12. *Psoas major*. 13. *Tendo psoae minoris*. 14. *M. pyriformis*. 15. *M. levator ani*. 16. *Membrana fibrosa medulae spinalis*. 17. *Nervi lumbales et sacrales*. 18. *Nervus obturatorius*. 19. *Nervus lumbalis quintus*. 20. 21. 22. *N. sacrales*. 23. *Vesica urinaria*. 24. *Ureter*. 25. *Urachus*. 26. *Vas deferens*. 27. *Vesicula seminalis*. 28. *Intestinum rectum*. 29. *Arteria aorta*. 30. *A. mesaraica inferior*. 31. *A. lumbalis quarta*. 32. *A. sacralis media*. 33. 34. *A. iliacae*. 35. *A. hypogastrica*. 36. *Truncus posterior*. 37. *A. ileolumbalis*. 38. *Ramulus anterior*. 39. *Ramuli musculo psoae immissi*. 40. *Anastomosis arteriae ileolumbalis cum circumflexa ilei*. 41. 42. *A. sacra lateralis*. 43. 44. 45. *A. obturatoria*. 46. *A. glutea superior seu iliaca posterior*. 47. *Truncus anterior A. hypogastricae*. 48. *A. umbilicalis*. 49. Obliterated umbilical Artery. 50. *A. vesicalis superior*. 51. *A. vesicalis*

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* From Tiedemann.

inferior. 52. *R. ad vesicam seminalem*. 53. *A. pudenda interna seu communis*. 54. *A. haemorrhoidea media*. 55. *R. ad musc. levatorem ani*. 56. *R. ad vesiculam seminalem*. 57. *R. per intestinum rectum sparsi*. 58. *A. Glutea inferior seu ischiadica*. 59. *R. ad musculum pyramidalem*. 60. *A. iliaca externa seu cruralis*. 61. 62. 63. 64. *A. circumflexa ilei s. abdominis*. 65. *A. epigastrica inferior*. 66. *Ramulus obturatorius*. 67. *Unio hujus ramuli cum arteria obturatoria*. 68. *Ramus ad funiculum spermaticum seu arteria spermatica inferior*.

Fig. II. Shows the course of the *Arteria pudenda communis*.

1. *Os coccygis*. 2. *Tubera ischiadica*. 3. *Rami ascendentes ossium ischiadicorum*. 4. *Ligamenta sacro-tuberosa*. 5. *M. glutei maximi*. 6. *Anus*. 7. *Sphincter ani externus*. 8. *Levatores ani*. 9. *Musculi perinaei transversi*. 10. *Urethra*. 11. *M. bulbo-cavernosi seu acceleratores urinae*. 12. *Corpora cavernosa penis*. 13. *Musculi erectores penis*. 14. *et* 22. *Arteriae pudendae communes*. 15 *et* 23. *A. haemorrhoideae externae*. * *A. perinaeae*. 16 *et* 24. *Ramus ischiadicus*. 17 *et* 25. *Ramulus perinaeus proprius*. 18 *et* 26. *R. ad musculum bulbo-cavernosum*. 19 *et* 27. *R. ad m. erectorem penis*. 20 *et* 28. *A. scrotalis posterior*.

Fig. III. *et* IV. Represent the course of the Pelvic Artery in the Female.

Fig. III. 1 — 10. 12. 13. 15. 16. 17. 18. 19. 20. 21. 22. 23. are already known from Fig. 1.

11. *Apertura interna canalis inguinalis*. 14. *Musculus obturatorius internus*. 24. *Vagina*. 25. *Uterus*, turned outwards. 26. *Ligamentum uteri rotundum*. 27. *Tuba Fallopii seu oviductus*. 28. *Fimbriae*. 29. *Ovarium, a ligamento lato obtectum*. 30. *Intestinum rectum*. 31 to 49 are already known from Fig. 1. 50. *Arteria uterina*.

51. *A. vaginalis.* 52. *Ramus ad uterum.* 53 to 64. are also already described in Fig. 1. 65. *Ramus ad ligamentum uteri rotundum.*

Fig. IV. Shews the course of the *Arteria pudenda communis.*

1. *Apex ossis coccygis.* 2. *Tuber ossis ischii.* 3. *Mons Veneris.* 4. *Labia pudendorum majora.* 5. *Clitoris.* 6. *Praeputium clitoridis.* 7. *Labia minora seu Nymphae.* 8. *Orificium cutaneum urethrae.* 9. *Aditus ad vaginam.* 10. *Anus.* 11. *Sphincter ani externus.* 12. *Levatores ani.* 13. *Musculus transversus perinaei anticus, et* 14. *posticus* 15. *Musculus constrictor cuni.* 16. *M. erectores clitoridis.* 17. *M. glutei maximi.* 18 *M. obturatorii interni.* 19. and 25. *Arteriae pudendae.* 20 and 26. *A. haemorrhoideae externae.* 21. *Ramulus ad tuber ischii.* 22. *A. transversa perinaei.* 23 and 28 *A. labialis pudendi posterior seu inferior.* 24 and 29. *Arteria clitoridea.*

THIRTY-SECOND PLATE.

Fig. I.

The body of a male, in which, after the removal of the whole anterior walls of the Trunk, and the removal of the Abdominal and Pelvic Organs, together with that of the fore and under part of the head, the Brain being turned rather upwards, and the Spinal Canal being opened in front by the removal of the bodies of the Vertebrae, the Spinal Marrow and the Nerves given off from it are shown in their course. The heads of the ribs on the left side, and their hinder extremities on the right side are removed for the purpose of seeing the posterior branches of the Dorsal Nerves which expand in the Muscles of the Spine. Many Muscles are also cut through and turned back.

1 to 12 are the twelve Cerebral pairs of Nerves.—1 to 8, the Cervical; 1 to 12, Dorsal; 1 to 5, Lumbar; and 1 to 5, Sacral Pairs are pointed out.

I. I. Plexus cervicalis superior. II. II. Plexus cervicalis inferior seu brachialis. IV. N. phrenicus. We may observe that this Nerve also receives two branches from the 5 and 6. Cervical Nerves. *V.* Three anastomosing branches of the 5. 6. and 7. Cervical Nerves to the *N. sympathicus. VI.* Connecting branch of the first Dorsal Nerve with the 8. Cervical Nerve. *VII. N. suprascapularis. VIII. N. pectorales anteriores. IX. N. subscapularis. X. N. subscapularis longus seu infrascapularis. XI. N. cutaneus externus. XII. N. cutaneus internus s. major. XIII. N. medianus. XIV. N. ulnaris. XV. N. radialis. XVI. N. axillaris. a. a. a.* are the posterior and *b. b. b. b.* the anterior branches or Intercostal Nerves. *N. intercostales,*

e. Connecting branches of the Dorsal Nerves with the *N. sympathicus maximus. A. Plexus lumbalis. B. Plexus sacralis. d. N. ileo-lumbalis. e. Rami posteriores nervorum lumbalium. f. N. lumbo-inguinalis. g. N. cutaneus externus femoris. h. N. ileo-inguinalis. i. N. obturatorius. k. N. cruralis. l. N. ischiadicus. m. N. pudendus communis. n. R. cutanei.* o. Connecting branches of the Lumbar and Sacral Nerves, with the *N. sympathicus maximus. C. N. sympathicus maximus.* C^1. *Ganglion cervicale supremum N. sympathici.* C^2. *Ganglion cervicale inferius.* C^3. *Ganglia thoracici N. sympathici.* C^4. *Ganglia lumbalia et sacralia N. sympathici.*

Fig. II.

In this is shown the lower part of the Spinal Marrow with its principal Nerves from behind. The parts are sufficiently distinct without description.*

Fig. III.

Connection of the *N. sympathicus* with the Nerves of the Spinal Marrow.†

A. Spinal marrow, *medulla spinalis.* *B.* Trunk of the Great Sympathetic or Ganglionic Nerve, *truncus nervi sympathici seu gangliosi. a. a. a. a. a. a.* Anterior roots of the Spinal Marrow from the 7^3 Cervical Nerve to the 4^3 Dorsal Nerve. They are so divided and separated above and below, that the *Ganglia spinalia* (b^1) may be seen lying behind. *b. b. b. b. b. b.* The posterior roots of the

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* Fig. I. and II. are from Bock: *Die Rückenmarksnerven. Auf 7 Tafeln. Leipzig*, 1827, and Fig. IV.

† From C. S. Wutzer: *De corporis humani gangliorum fabrica atque usu monographia. Cum tabula aenea. Berolini* 1817.

Spinal Marrow. b^1. b^1. b^1. b^1. b^1. b^1. The Spinal Ganglions, *ganglia spinalia,* formed by the posterior roots of the Spinal Marrow. *d. d. d. d.* The 1^3. 2^3. 3^3. and 4^3. *Ganglion thoracium* of the *N. sympathicus maximus.* c^1. The anterior branch and c^2. the posterior branch of this Nerve.

The numerous connexions of the Spinal Nerves with the *N. sympathicus* and with each other, are well seen here, and require no farther explanation.

THIRTY-THIRD PLATE.

A. Development of the Brain.*

Fig. I. A Foetus at the *seventh week.*

a. Cervical processes.

Fig. II. Lateral view of the Brain and Spinal Marrow of this Foetus.

a. Spinal Marrow. *b.* Enlargement and bending forwards of the Spinal Marrow. *c.* Cerebellum. *d.* Quadrigeminal Mass. *e.* Optic Beds. *f.* Membranelike Hemisphere of the Cerebrum. *g.* Elevation analogous to the Striated Body.

Fig. III. Posterior view of the same Brain, separated or opened throughout its whole length.

a. Spinal Marrow. *b.* Entrance into the Canal of the Spinal Marrow. *c.* Elevations or projections on the Spinal Marrow. *d.* Cerebellum divided and spread like a bridge over the fourth Ventricle. *e.* Quadrigeminal Mass divided in the middle.

Fig. IV. Brain of a Foetus at the *ninth week.*

a. a. The two Columns of the Spinal Marrow separated by a longitudinal groove. *b.* Cerebellum. *c.* Parts from which the Quadrigeminal Bodies are formed. *d.* Optic Beds. *e.* Membranelike Hemisphere turned backwards and inwards.

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* After Tiedemann. *Anatomie und Bildungsgeschichte des Gehirns im Foetus des Menschen nebst einer vergleichenden Darstellung des Hirnbaues in den Thieren. Mit sieben Tafeln Abbildungen. Nach der Natur gezeichnet von Dr. Martin Münz. Nürnberg in der Steinischen Buchhandlung.* 1816.

Fig. V. Brain of a Foetus at the *twelfth week* in situ in the skull.

a. a. The Cranial coverings opened and turned backwards. *b.* Spinal Marrow. *c.* Enlargement of the Spinal Marrow and its bend forward. *d.* Cerebellum. *f.* Process from which the Quadrigeminal Bodies are formed. *g.* Column of the Spinal Marrow passing outwards and forwards, commonly called *Crus Cerebri.* *h.* Membranelike Hemisphere of the Cerebrum turned backwards and inwards, which as yet does not cover the process from which the Quadrigeminal Bodies are formed. *i.* Optic Nerve of the left side. *k.* Olfactory Nerve of the same side. *l.* Accessory Nerve which arises from the side of the Spinal Marrow.

Fig. VI. Posterior view of the same Brain and Spinal Marrow.

a. a. Spinal Marrow with its posterior Longitudinal Groove. *b.* Cerebellum, and under it, the Fourth Ventricle. *c. c.* Hemispheres of the Cerebrum.

Fig. VII. Inferior view of the same Brain.

a. a. Spinal Marrow with its anterior Longitudinal Groove. *b. b.* Enlargement of the Spinal Marrow, and its bend forwards. *c. c.* Limbs of the Cerebellum, *Crura Cerebelli,* coming from the Spinal Marrow. *d. d.* Cerebellum. *e. e.* Limbs of the Cerebrum, *Crura Cerebri.* *f.* Mass of the Mammillary Eminences. *g.* Appendage of the Cerebrum, commonly called the *Pituitary Gland.* *h. h.* Anterior Lobes of the Cerebrum. *i.* Posterior rounded Appendage, representing the Middle and Posterior Lobes. *k.* Optic Nerves. *l.* Olfactory Nerves arising from the Fissures of Sylvius.

Fig. VIII. Superior view of the same Brain with the Membranelike Hemispheres turned aside from each other.

a. a. The two Columns of the Spinal Marrow. *b.* Posterior Longitudinal Groove. *c. c.* Cerebellum. *d. d.* Mass to become the Quadrigeminal Bodies. *e. e.* Optic Beds. *f. f. g. g.* Membranelike Hemispheres turned outwards from each other. *h. h.* Striated Bodies which are rather broader in front, and divided into two parts by a slight depression. *i.* Connexion of the two Hemispheres, or commencement of the Great Commissure or Beam, *Corpus Callosum.* *k. k.* Lateral Ventricles with the radiated folds of the inner surface of the Hemispheres.

Fig. IX. The Spinal Marrow with its Canal, from the same Foetus.

a. a. a. a. The walls of the Spinal Marrow separated from each other at the Posterior Longitudinal Groove, and thereby exposing the Canal which terminates above in the Fourth Ventricle. *b. b.* Limbs of the Cerebellum approaching each other.

Fig. X. The very spacious cavity existing in the structure of the Quadrigeminal Bodies opened obliquely from above, and from the right to the left side, by the removal of the upper wall.

a. a. Columns of the Spinal Marrow. *b. b.* Cerebellum. *c.* The thin Membranelike Wall of the Quadrigeminal Bodies on the right side. *d. e.* The left wall of the Quadrigeminal Bodies which seems thicker in consequence of the obliquity of the section approaching near the Limbs of the Cerebrum beneath the Quadrigeminal Bodies, whilst the Membranelike Wall, by its expansion above, has not lost any of its bulk.

A view from above is here gained into the cavity of the Quadrigeminal Bodies; and the small posterior opening from the Fourth Ventricle with the large anterior aperture into the Third Ventricle are exposed.

Fig. XI. Upper View of the Brain of the same Foetus.

a. a. Spinal Marrow. *b.* Cerebellum. *c.* Fourth Ventricle. *d. d.* Membranelike structure of the Quadrigeminal Bodies near the Longitudinal Groove, where they are connected with each other. *e.* Third Ventricle exposed by drawing the Optic Beds apart from each other. *f. f.* The inner smooth surface of the separated Optic Beds. *g.* Posterior Commissure. *h. h.* Striated Bodies which bend in an arching form around the Cerebral Limbs expanding in the Cerebral Membrane. *i. i.* Membrane of the Hemispheres cut away at the sides.

Fig. XII. Vertical Section of the Brain of the same Foetus.

a. Front of the Spinal Marrow. *b.* Fold of the Spinal Marrow turned back. *c.* The Canal of the Spinal Marrow. *d.* Bending of the Spinal Marrow forwards. *e.* A small enlargement of the edge of the Spinal Marrow, where it retires on the Fourth Ventricle. *f.* Second curving upwards of the Spinal Marrow. *g.* Perpendicular section of the Cerebellum. *h.* Thin plates connecting the Cerebellum with the Quadrigeminal Membrane or the commonly called Valve of the Brain. *i.* Spinal Marrow becoming thicker as it enters into the Cerebral Limbs. *k. k.* Vertical Section of the Quadrigeminal Membrane. *m.* Third Ventricle. *n.* Cerebral Appendage. *o.* Optic Bed. *p.* Olfactory Nerve. *q.* Vertical section of the still perpendicular Great Commissure, *Corpus Callosum.* *r.* Anterior Limb of the not yet connected *Fornix,* which curves backwards to pass over into the *Cornu Ammonis*; under its loose descending edge is found the spacious entrance into the Lateral Ventricle by which the Vascular Membrane of the Brain penetrates to form the *Plexus Choroides.* *s.* The still very small Hemispheres of the Cerebrum.

Fig. XIII. Upper Surface of the Brain of a Foetus from *fourteen to fifteen Weeks* old.

a. a. Spinal Marrow. *b.* Columns of the Spinal Marrow retiring from each other above, by which the Fourth Ventricle is produced. *c.* Cerebellum which has, as yet, no furrows. *d. d.* Right Hemisphere of the Cerebrum which does not yet cover the Quadrigeminal Mass. *e.* A depression of the Membranelike Hemispheres, several of which are seen.

Fig. XIV. Inferior View of the same Brain.

a. a. Spinal Marrow. *b.* Anterior Longitudinal Groove of the Spinal Marrow. *c. c.* Pyramids or Pyramidal Columns of the Spinal Marrow. *d. d.* Restiform or Cordlike Bodies, or Limbs of the Spinal Marrow to the Cerebellum. *e. e.* Olive-shaped Columns of the Spinal Marrow, from which the Olivary Bodies have not yet been formed. *f. f.* Cerebellum. *g.* Cavity of the Cerebellum. *h.* Annular Protuberance, *Pons Varolii.* *i. i.* Limbs of the Cerebrum. *k.* Fifth pair of Nerves. *l.* Mammillary Bodies, *Eminentiae Mammillares seu Candicantes.* *m.* Cerebral Appendage. *n.* Optic Bed. *o.* Olfactory Nerve. *p. p.* Sylvian Fissures. *q. q.* Middle Lobes of the Cerebrum. *r.* Hinder Lobe of the Cerebrum. *s. s.* Front Lobes of the Cerebrum.

Fig. XV. Lateral View of the same Brain.

a. Spinal Marrow. *b.* Bending of the Spinal Marrow forwards. *c.* Its enlargement. *d.* Restiform Body, or Columnal Limb of the Spinal Marrow to the Cerebellum. *e.* Fifth pair of Nerves. *f.* Entrance into the cavity of the Cerebellum and of the Fourth Ventricle. *g.* Cerebellum. *h.* Quadrigeminal Mass. *i.* Limb of the Cerebrum. *k.* Posterior Lobe of the Cerebrum. *l.* Anterior Lobe of the Cerebrum. *m.* Optic Nerve. *n.* Olfactory Nerve. *o.* Sylvian Fissure.

Fig. XVI. Perpendicular Section of the Brain.

a. Spinal Marrow. *b.* Canal of the Spinal Marrow. *c.* Fourth Ventricle. *d.* Lesser eminence of the Spinal Marrow. *e.* Cerebellum. *f.* Enlargement of the Spinal Marrow. *g.* Cavity of the Quadrigeminal Mass. *h.* Upper Membranelike Wall of the Quadrigeminal Mass. *i.* Optic Bed. *k.* Third Ventricle. *l.* Cerebral Appendage. *m.* Mammillary Eminence. *n.* Optic Nerve. *o.* Olfactory Nerve. *p.* Beam, *Corpus Callosum* or Greatest Cerebral Commissure, *Commissura Maxima Cerebri.* *q.* Anterior Pillar of the *Fornix* curving over the Optic Bed. *r. r.* Inner surface of the Hemisphere of the Cerebrum.

Fig. XVII. The Ventricles laid open.

a. a. Spinal Marrow. *b. b.* Cerebellum. *c.* Fourth Ventricle. *d. d.* Quadrigeminal Mass. *e. e. e.* Edges of the retroverted upper walls of the Lateral Ventricles. *f.* Plexus of Veins. *g.* Forepart of the Arch of the Lateral Ventricle. *h.* Hinder part of the same. *i.* Striated Body. *k. Cornu Ammonis* or *Hippocampus Major. l. Hippocampus Minor.* *m. m.* Thicker position of the Membrane of the Hemisphere ascending from the Striated Body.

Fig. XVIII. The Hemispheres of the Cerebrum separated from each other above.

a. a. Spinal Marrow. *b. b.* The Columns of the Spinal Marrow separated laterally from each other. *c. c.* Cerebellum. *d.* Its middle part. *e.* Fourth Ventricle. *f. f.* Quadrigeminal Mass with its Longitudinal Groove. *g.* Optic Bed. *h.* Pineal Gland. *i.* Its pedicle. *k.* Third Ventricle. *l.* Anterior Columns of the *Fornix.* *m. Corpus Callosum.* *n.* Posterior Column of the *Fornix* curving and running backwards into the *Cornu Ammonis* with its edge, *Tinea.* *o. o.* Pit or depression in the Cerebral Membrane which forms internally the *Cornu Ammonis.* *p. p. p. p.*

Hemispheres of the Cerebrum. *q.q.* Depressions in the Cerebral Membrane which form the fold or elevation of the *Hippocampus Minor.*

Fig. XIX. Posterior view of the Brain and Spinal Marrow in connexion.—The two enlargements of the Spinal Marrow, and its termination in the *Cauda Equina* are also seen. On the whole of the posterior surface is seen the Longitudinal Groove entering into the Canal of the Spinal Marrow.

a. a. The two Columns of the Spinal Marrow. *b. b.* Points at which they separate and form the Fourth Ventricle. *c.* Fourth Ventricle. *d. d.* Cerebellum with its transverse furrows. *e. e.* The still partially uncovered Quadrigeminal structure. *f.f.* Hemispheres of the Cerebrum.

Fig. XX. Upper View of the Brain with the Hemispheres separated from each other.

a. a. Spinal Marrow. *b.* Point at which the Canal of the Spinal Marrow runs into the Fourth Ventricle, at the separation of its Limbs or Columns. *c.* Hinder part of the Fourth Ventricle. *d. d.* Cerebellum. *e. e.* Quadrigeminal structure with its slight vertical furrow. *f.f.* The Lateral halves of the Cerebrum separated from each other. *g.* Right Lateral Ventricle, which is exhibited by the removal of the Hemisphere. *h.* Striated Body. *i. i.* Hollows of the furrows on the inner wall of the left Hemisphere. *k. k.* Optic Beds. *l. l.* Pedicles of the Pineal Gland. *m.* Pineal Gland. *o.* Third Ventricle. *p. p.* Anterior pillars of the *Fornix.* *q.* *Corpus Callosum.*

Fig. XXI. Perpendicular Section of the same Brain.

a. Spinal Marrow with its Canal. *b.* Point at which it inclines to one side. *c.* Elevation corresponding to the *Taenia Grisea* of Wenzel. *d.* Forward bend of the Spinal Marrow. *e.* Annular protuberance divided. *f.f.* Limb of the Cerebrum. *g.* Cerebellum consisting of five branches and lobes. *h.* Fourth Ventricle and cavity of the Cerebellum. *i.* Cavity of the Quadrigeminal Bodies. *k.* Wall of the Quadrigeminal Bodies. *l.* Supposed Optic Beds. *m. n. Corpus Callosum.* *o.* Anterior Commissure. *p.* Cerebral Appendage. *q.* Mammillary Eminence. *r.* Anterior Pillar of the *Fornix*; near it in front is placed the Fifth Ventricle in the cavity of the partition, *Septum Lucidum,* beneath the *Corpus Callosum.* *s. t.* Posterior Pillar of the *Fornix* curving upon the Optic Bed. *u.* Third Ventricle. *v. v. v. v.* Furrows or depressions. *w.* Olfactory Nerve.

Fig. XXII. Upper Surface of the Brain of a Foetus at *twenty-one Weeks.*

a. Spinal Marrow cut through. *b.* Enlargement of the Spinal Marrow. *e.* Cerebellum with its transverse furrows. *d. d. d. d.* Hemispheres of the Cerebrum.

Fig. XXIII. Under Surface of the same Brain.

a. a. Columns of the Spinal Marrow. *b.* Bending forwards of the Spinal Marrow. *c. c.* Pyramids. *d.* Olivary Columns of the Spinal Marrow. *e. e.* Annular Protuberance. *f. f.* Passage into the Fourth Ventricle, and the Cavity of the Cerebellum, by which the Vascular Membrane, *Pia Mater,* enters. *g. g.* The two Hemispheres of the Cerebellum. *h. h.* Posterior Lobes of the Cerebrum. *i. i.* Sylvian Fissures. *k. k.* Anterior Lobes. *l. l.* Middle Lobes. *m. m.* Limbs of the Cerebrum. *n.* Mammillary Eminence. *o.* Cerebral Appendage. *p.* Optic Nerve. *q.* Olfactory Nerve.

Fig. XXIV. Superior View of the same Brain, the Hemispheres being somewhat separated, and the Lateral Ventricle opened.

a. a. Spinal Marrow. *b. b.* Its enlargement. *c.* Mesial part of the Cerebellum, or Vermiform process, near the little

Posterior or Purselike Notch. *d. d.* Quadrigeminal Bodies. *e.* Optic Bed. *f.* Pineal Gland with its pedicles. *g.* Great Commissure of the Cerebrum, *Corpus Callosum. h. h. h.* Edges of the divided Hemisphere. *i. Taenia. k. k. Hippocampus Major. l. Hippocampus Minor. m.* Depression between the Optic Bed and Striated Body, the *Taenia Semicircularis* not being yet formed. At this point the Vascular Membrane enters to form the *Plexus Choroides. n.* The large convolution analogous to the Striated Body. *o.* Anterior Horn of the Lateral Ventricle. *p.* Middle or Descending Horn. *q.* Posterior Horn. *r.* Right half of the Brain.

Fig. XXV. Perpendicular Section of the same Brain.

a. Spinal Marrow. *b.* Lesser Eminence or Grey Line, *Tinea Grisea. c.* Point of the Fourth Ventricle, or Pen, *Calamus Scriptorius. d.* Fourth Ventricle. *e.* Branches and commencing fibres of the Cerebellum. *f.* External furrows of the Cerebellum. *g.* Oblong Marrow. *h.* Annular Protuberance. *i.* Limb of the Cerebrum. *k.* Cavity of the Quadrigeminal Bodies. *l.* Thick wall of the Quadrigeminal Mass. *m.* Anterior Cerebral Valve or Medullary Expansion of Reil. *n.* Passage of the Quadrigeminal Bodies into the Third Ventricle. *o.* Optic Bed. *p.* Third Ventricle. *q.* Hollow Cerebral Appendage. *r.* Mammillary Eminence. *s.* Anterior pillar of the *Fornix. t. Corpus Callosum. u.* Transparent Partition, *Septum Lucidum. v.* Point in the Third Ventricle where the pillar of the *Fornix* ascends. *w.* Olfactory Nerve. *x.* Depression which in the Lateral Ventricle corresponds to the *Hippocampus Minor. y. y. y. y.* Depressions in the substance of the Brain, indicating the commencement of the furrows and convolutions. 3. Anterior Commissure.

Fig. XXVI. A Portion of the Left Hemisphere with its

external depressions, which correspond to the *Hippocampus Major* and *Minor*.

a. a. a. External surface of the Posterior and Middle Lobes. *b.* Edge of the *Taenia*. *c. Taenia*. *d.* Posterior pillar of the *Fornix*. *e. e.* Depression corresponding to the *Hippocampus Major*. (Fig. *i. k. k.*) *f.* Depression corresponding to the *Hippocampus Minor*. (Fig. *i. l.*)

Fig. XXVII. The right Hemisphere of the same Brain, in which is shown the Expansion of the Fibres of the Limb of the Cerebrum in the Striated Body, and in the Wall of the Hemisphere.

a. Spinal Marrow. *b.* Enlargement of the Spinal Marrow. *c.* Cerebellum with its transverse furrows. *d.* Quadrigeminal Body. *e.* Optic Bed. *f.* Expansion of the fibres of the Limbs of the Cerebrum in the elevation, and backward inclination of the Striated Body. *g.* Under surface of the loose and backward inclined Striated Body, in which the fibres from the Limb of the Cerebrum are seen entering it. *h. h. h.* Course of the expanding fibres of the Limb of the Cerebrum on the inner surface of the Hemisphere, after a thin layer of the loose fibrous substance has been removed with the knife. *i. i.* Expansion of the fibres outwards into the divided thick lateral wall of the Hemisphere. *k. k.* The same expansion in the anterior and posterior wall. *l. l.* The same expansion into the inner and under wall.

Fig. XXVIII. A Portion of the Upper Wall of one Hemisphere.

a. a. Upper surface of the piece, after the Vascular Membrane, overlaid with a layer of white substance, has been removed, which, under the Microscope, appears to be formed of globules. *b. b.* Inner surface of the Vascular Membrane separated and turned back, to which a thin layer of white loose fibrous substance adheres. *c.* Point where a thicker portion of that white substance has separated in turning back the Vascular Membrane. *d.* The same portion adhering to the turned-back Vascular Membrane. *e. e.* Fibres on the surface of a piece which has been broken off. *f. f.* Layer of the white globular-like substance lying upon the fibres.

Fig. XXIX. Under Surface of the Brain of a Foetus at at *twenty-seven Weeks.*

a. Left Column of the Spinal Marrow. *b.* Canal of the Spinal Marrow shown by the section. *c.* Pyramid. *d.* Olive. *e.* Restiform Body. *f.* Under surface of the Cerebellum. *g. h.* The Flock. *i.* Annular Protuberance composed of transverse medullary fibres with a longitudiual depression in which the Basilar Artery lies. *k.* Longitudinal course of the Limb of the Cerebrum, a continuation of the Pyramid. *l.* Mammillary Eminences. *m.* Cerebral Appendage. *n.* Connexion of the Optic Nerves. *o. o.* The Posterior Lobes of the Cerebrum extending over the Cerebellum. *p. p.* Middle Lobes. *q.* Anterior Lobes. *n.* Olfactory Nerve coming out of the Sylvian Fissure. *s.* Clublike termination of the Olfactory Nerves. *t.* Commencement of the Convolutions 1. First Pair of Nerves springing from the Sylvian Fissure, and from the inferior outwardly expanding fibres of the Striated Body. 2. Second Pair of Nerves springing from the Anterior Quadrigeminal Body, from the *Corpus Geniculatum*, and from the upper part of the Optic Bed. 3. Third Pair of Nerves passing out from the Limb of the Cerebrum. 4. Fourth Pair of Nerves springing from the Great Nervous Expansion or Cerebral Valve. 5. Fifth Pair of Nerves arising from between the Olivary Column and the Restiform Body, and penetrating through the Annular Protuberance. 6. Sixth Pair of Nerves arising from between the Pyramidal and Olivary Columns. 7. Seventh Pair of Nerves arising from the Oblong Marrow. 8. Eighth Pair of Nerves arising from the Grey Line. 9. Ninth, 10. Tenth, 11. Eleventh Pair of Nerves.

Fig. XXX. Lateral View of the same Brain.

a. Spinal Marrow. *b.* Restiform Body, or Column of the Oblong Marrow to the Cerebellum. *c.* Pyramid. *d.* Olive-shaped Body. *e.* Cerebellum. *f.* Bending forwards of the Spinal Marrow. *g.* The Flock. *h.* Annular Protuberance. *i.* Middle Lobe of the Cerebrum. *k.* Posterior Lobe. *l.* Anterior Lobe. *m.* Deep and wide Sylvian Fissure, ascending far upwards on the side of the Cerebrum: in this the Middle Cerebral Artery lies, which sends many branches deep inwards to the interior of the Striated Body. *n.* Olfactory Nerve passing out of the Sylvian Fissure. *o. o. o.* Depressions in the substance of the Cerebrum, or commencing Convolutions.

Fig. XXXI. Upper View of the same Brain. The left Hemisphere is cut through, and the Lateral Ventricle opened.

a. Spinal Marrow. *b.* Cerebellum. *c.* Quadrigeminal Body. *d. Corpus Callosum.* *e.* Right half of the Cerebrum turned somewhat aside, by which the *Corpus Callosum* is rendered visible. *f. f. f.* Depressions or furrows, the commencement of the Convolutions. *g.* The very thick external wall of the Lateral Ventricle cut through, with the radiated and layerlike fibres lying against each other. *h.* The thin anterior and posterior wall of the Lateral Ventricle. *i.* The thinnest or inner wall of the same. *k.* Depressions or incipient convolutions cut through. *l.* The large Striated Body. *m.* Anterior horn of the Lateral Ventricle. *n.* Descending horn of the same. *o.* Posterior horn. *p. Hippocampus Major.* *q. Taenia seu Fimbria.* *r.* Optic Bed joining to the Striated Body: here, in the Lateral Ventricle the *Plexus Choroides* runs below the *Tinea*. *s. Hippocampus Minor*.

Fig. XXXII. Inferior View of the Fourth Ventricle, and the Cerebellum.

a. a. Spinal Marrow. *b. b.* Restiform Bodies. *c. c.* Grey Lines, *Taeniae Cinereae* of the Wenzels'. *d.* Fourth Ventricle. *e.* Posterior upper Lobes of the Cerebellum. *f. f.* Posterior under Lobes. *g. g.* Slender and Double-bellied Lobes. *h. h.* Hinder thin edge of the Cerebellum turned inwards, showing the Medullary Expansion of Reil. *i. i.* The Flock. *k.* Pyramids of the Lesser Vermiform process. *l.* The *Uvula*.

Fig. XXXIII. Upper View of the Brain of the same Foetus.

a. Spinal Marrow. *b.* Posterior Longitudinal Groove. *c. c.* Restiform Bodies with the thin hinder Columns of the Spinal Marrow. *d.* Central Lobes of the Cerebellum. *e. e.* Quadrilateral Lobes. *f. f.* Posterior upper Lobes. *g.* Olivary Columns. *h.* Anterior pair of Quadrigeminal Bodies. *i.* Posterior pair of Quadrigeminal Bodies. *k.* Posterior Commissure. *l.* Pineal Gland divided. *m.* Pedicle of the Pineal Gland. *n.* Upper surface of the Optic Bed. *o.* Inner surface of the Optic Bed. *p.* Third Ventricle. *q.* Striated Body. *r.* Its anterior inner part. *s.* Its posterior outer part. *t.* Fibres of the Limb of the Cerebrum extending outwards from the Striated Body. *u.* Anterior Commissure divided. *v. v. Corpus Callosum* divided. *w.* The one layer of the *Septum Lucidum* extending from the *Fornix* towards the *Corpus Callosum*. *x. Hippocampus Major*. *y. Tinea*. *z.* Depression near the *Hippocampus Major*, into which a fold of the Vascular Membrane sinks.

Fig. XXXIV. Perpendicular Section of the same Brain.

a. Spinal Marrow. *b,* Oblong Marrow. *c.* Annular

Protuberance. *d.* Grey Line of Wenzel. *e.* Fourth Ventricle. *g.* Cerebral Valve of Vieussens, or Great Medullary Expansion of Reil. *h. i.* Vertical branch of the Cerebellum of Reil. *k. l. m.* Horizontal branch of the Cerebellum of Reil. *n.* Quadrigeminal Body. *o.* Optic Bed. *p.* Third Ventricle. *q.* Limb of the Cerebrum. *r.* Mammillary Eminence. *s.* Fibres which come from this Eminence and pass into the *Fornix.* *t.* Anterior Commissure. *u.* Funnel of the Cerebral Appendage. *v.* Optic Nerve. *w.* Plate of the *Septum Lucidum,* and the cavity within it. *x. Tinea.* *y. Fornix* descending as the *Hippocampus Major.* *z. Corpus Callosum.* *** Depressions and Furrows, incipient Convolutions into which the folds of the Vascular Membrane sink.

Fig. XXXV. Right Half of the same Brain.

a. Mammillary Eminence. *b.* Fibres from the Eminence ascending and curving back to form the *Fornix.* *c.* Long fibres which, ascending from below and before, curve over the *Corpus Callosum* on the inner surface of the Hemispheres, and then become connected with the *Hippocampus Major.* *d, Hippocampus Major* terminating in the Middle Lobe. *e.* Depressions near it, into which the Vascular Membrane sinks. *f. Corpus Callosum.* *g.* Plate of the *Septum Lucidum.* *h.* Fibres of the Limb of the Cerebrum after the removal of the Optic Bed, running into the Striated Body. *i. i.* The arching Striated Body curving around the Limb of the Cerebrum. *k.* Depression. *l.* Olfactory Nerve. *m.* Optic Nerve.

Fig. XXXVI. Left Hemisphere of the Cerebrum, with the distinct Expansion of the Fibres after the removal of the Outer Layer, in which the Convolutions are found.

a. Point from which the expansion commences: to its inner side lies the *Corpus Striatum.* *b. b. b.* Fibres of the

Limb of the Cerebrum expanding forwards, upwards, and backwards. *c. c. c.* Fibres expanding periphericallly and parallel to each other, covered with a layer of white substance.

Fig. XXXVII. *a.* Divided Spinal Marrow. *b.* Point where the Pyramidal Columns cross. *c.* Pyramids becoming broader as they pass upwards and forwards. *d.* Passage of the Pyramidal Columns through the Annular Protuberance and interweaving of their Longitudinal with the Transverse fibres of the Protuberance. *e. e. e. e.* Pyramidal Columns extending from out the Annular Protuberance, as the Limbs of the Cerebrum, and their extension into the Optic Beds and Striated Bodies. *f.* Portion of the Annular Protuberance turned back. *g.* The other half of the Protuberance. *h.* Olivary Body. *i. i.* Restiform Bodies. *k.* The Flock. *l. l.* The two halves of the Cerebellum. *m.* One of the fibrous bundles descending from the Optic Beds to the Mammillary Eminence. *n.* Point at which it is surrounded by the white substance. *o.* Its ingress into the anterior pillar of the *Fornix.*

Fig. XXXVIII. *a.* Spinal Marrow seen from the side. *b.* Pyramidal Column. *c.* Its passage through the Annular Protuberance, and extension into the Limb of the Cerebrum. *d.* Annular Protuberance cut through. *e.* Olivary Body. *f.* Olivary Column which becomes visible after the removal of one half of the Annular Protuberance. *g.* Course of the ascending fibres of the Olivary Column towards the Quadrigeminal Body. *h.* Restiform Body. *i.* Restiform Body cut through where it enters the Cerebellum. *k.* Large Medullary *nucleus* of the Cerebellum cut through obliquely. *l.* Limb of the Cerebellum to the Quadrigeminal Bodies. *m. m.* The branches of the Cerebellum cut through obliquely, and resting upon the Medullary *nucleus.* *n.* Upper layer of the Quadrigeminal Body removed. *o.* Lower fibres of the Olivary Column passing towards the Optic Bed.

B. Formation and Development of the Spinal Marrow.*

Fig. I. Transverse Section of the Spinal Marrow of a Boy *a Year* old, below the Anterior Pyramids.

f. a. Anterior Columns of the Spinal Marrow. The inner edges of these Columns are not yet turned backwards, as they are seen farther on. Hence, the Grey Substance, *Substantia Cinerea,* in this section, has the form of a horseshoe, and its anterior horns are not yet seen. *f. p.* Posterior Prismatic Columns which descend from the lower peduncles of the Cerebellum. *p.* Lesser Columns of the Posterior Pyramids which assume the form of little plates as they descend, small and penetrating, between the above-named Posterior Columns. *s. a.* Anterior Mesial Furrow which is very shallow because the inner edges of the Anterior Columns are not yet arched, and curved backwards as observed in subsequent states. *s. p.* Posterior Mesial Furrow formed in the Cervical Region by the approximation of the Posterior Pyramids. This Marrow is distinctly deeper than the Anterior, on account of the prismatic form of the Posterior Columns. *s. l.* Posterior Lateral Furrows corresponding to the anterior horns of the grey substance, and which separate the anterior from the posterior horns. *s. p. p.* Furrow of the Posterior Pyramids. They are only found in the Cervical Region, and scarcely visible; because no membrane penetrates between them and the Posterior Columns. *r. a.* Anterior Roots of the Dorsal Nerves. *r. p.* Posterior Roots.

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* After Rolando.

Fig. II. Transverse Section of the Spinal Marrow of a Boy *eight Years* old, below the Anterior Pyramids.

f. a. Anterior Columns; the inner edges of which, as yet, scarcely touch, and have not curved backwards, The grey substance is seen in the form of a horse-shoe, or of the tongue-bone, and therefore its anterior horns do not yet project. *a. w.* Root of the Accessory Nerve, *N. Accessorius Willisii.* *e. p.—s. a.—s. p.—s. p. p.* These letters indicate the same points as in Fig. I. *r. a.* Anterior roots of the Dorsal Nerve. *r. p.* Posterior roots of the same.

Fig. III. Transverse Section of the Spinal Marrow in the same Individual above the Second Cervical Vertebra.

f. a. Anterior Columns; the inner edges of which are curved more inwards, so that the anterior furrow is rather deeper, and the anterior horns of the grey substance better expressed. This substance, therefore, appears in shape of half-moons, connected by a thin bridge of the same substance with each other. *f. p.—n. a.—s. a.—s. p.—l. s.—s. p. p. —r. a.—r. p.* These letters indicate the same points as in Fig. XXXIX.

Fig. IV. Transverse Section of the same Spinal Marrow at the Fourth Cervical Vertebra.

There is no difference in this figure except in the grey substance being in greater quantity, and the anterior horns being thicker.

Fig. V. Transverse Section of the same Spinal Marrow between the Sixth Pair of Cervical Nerves.

The Grey Substance is here also in greater quantity. Some very white threads extend from its anterior horns. The Posterior Columns are broader, and the Accessory Nerve less separated from the Posterior Lateral Furrow, *a*. Little furrows or clefts which are found between the folds of the *Lamina Medullaris*.

Fig. VI. Transverse Section of the same Spinal Marrow between the Roots of the Eighth Pair of Dorsal Nerves.

In this figure the two portions of the Grey Substance are seen not so much arched, and their anterior and posterior horns are straighter, as in the middle of the Dorsal Region.

Fig. VII. Transverse Section of the Spinal Marrow of a Young Man aged *fifteen Years*.

The incision is made under the First Pair of Cervical Nerves. The inner edges of the Anterior Columns are slightly curved inwards. The Grey Substance appears in the form of a horse-shoe.

Fig. VIII. Section similar to the preceding, immediately beneath the Seventh Pair of Cervical Nerves.

By this incision, it appears that the Grey Substance is in smaller quantity in this Spinal Marrow; and that it expands into fibres which penetrate between the Medullary fibres of the Anterior Columns.

Fig. IX. Transverse Section of the Spinal Marrow of a Man aged *fifty-five Years*, made through the Roots of the First Pair of Dorsal Nerves.

f. a. Anterior Columns; the inner edges of which are very much curved inwards, and surround the anterior horns of the Grey Substance, which in this region is in greater quantity. *f. p.* Prismatic Posterior Columns. *s. a.* Anterior Mesial Furrow into which a fold of the *Pia Mater* penetrates. *s. p.* Posterior Furrow, which is deeper, because the Posterior Columns are wider at their anterior angle. This is always less distinct, because the *Tunica Pia Mater* does not penetrate into it, as it does into the Anterior. *s. l.* Posterior Lateral Furrows: by maceration the Posterior are entirely separated from the Anterior Columns at this point. On the contrary I have not succeeded in finding the Anterior Columns separate and distinct in the direction of the lesser Anterior Roots of the Spinal Nerves, so that we may certainly determine that no Anterior Lateral Furrow exists.

Fig. V. Transverse Section of the same Spinal Marrow through the Roots of the Second Pair of Dorsal Nerves.

Fig. XI. Transverse Section of the same Spinal Marrow through the Roots of the Eighth Pair of Dorsal Nerves.

The Grey Substance is in smaller quantity, and it may be observed that its edges are not straight where the numerous elongations pass off, which penetrate between the thin Medullary Fibres of the Anterior Columns. The Posterior Columns are more narrow.

Fig. XII. Transverse Section of the same Spinal Marrow between the Ninth Pair of Dorsal Nerves.

Fig. XIII. Transverse Section of the same Spinal Marrow at the Roots of the Twelfth Pair of Dorsal Nerves.

The Grey Substance here again becomes more abundant: upon the inner side of its Posterior Horns I have seen two small apertures, which, I think, are for blood-vessels. I do not, however, venture to decide whether they be those of which Gall speaks, and which he has followed to the Optic Beds.

Fig. XIV. Transverse Section of the same Spinal Marrow between the Roots of the First Pair of Lumbar Nerves.

The numerous variations to which the Grey Substance is liable are shown in the Observations of Caldani, *Mem. della Società Italiana, tomo* xix.

Fig. XV. Transverse Section of the same Spinal Marrow at the Roots of the Third Pair of Lumbar Nerves.

The Grey Substance is here seen in much larger quantity. The inner edges of the Anterior Columns are not now inclined inwards. The Anterior Furrow extends partially into the Grey Substance as well as the fold of the *T. Pia Mater*. The Posterior Columns are much broader than in the Dorsal Region.

N. B.—Fig. XVI. XVII. and XVIII. are doubled, the upper larger, and the others of their natural size. In Fig. XVI. the fibrous structure of the Anterior Columns, and in Fig. XVIII. the approximation of the Anterior Roots to the Posterior Mesial Furrow are seen. In its middle are the two Anterior Spinal Arteries, *A. Spinales Anteriores*. At this point, and at that which corresponds with the Fourth Pair of Cervical Nerves, I have seen the Posterior White Fibres.

Fig. XVI. Transverse Section of the Spinal Marrow at the Roots of the Fourth Pair of Sacral Nerves.

The inner edges of the Anterior Columns are still somewhat curved and turned inwards nearly as at the upper part of the Spinal Marrow, and behind the Anterior Columns. The Anterior Horns are wanting to the Grey Substance, which is more abundant in the Lumbar Region. The Grey Substance is seen to have points and angles in front, which run into the Medullary Fibres of the Anterior Fascicule. The fold of the *Pia Mater* entering the Anterior Mesial Furrow, penetrates also to the middle of the Grey Substance. The Posterior Columns are pretty wide. *s. a.—c. a.—s. l. f. p.—s. p.* Mark the same points as in the preceding figures.

Fig. XVII. Transverse Section of the Spinal Marrow between the Roots of the First Pair of Sacral Nerves.

The inner edges of the Anterior Columns are curved somewhat more inwards. The inner horns of the Grey Substance are thicker and unequal. The reason why I was led to consider the two apertures to be for blood-vessels is, that I found in this section one single opening. Hence they must not be confused with the small canal seen in young animals, which is a type of the Canal of the Spinal Marrow, existing previous to its being filled up with Grey Substance; and hence is the Grey Substance commonly seen in its centre.

It must, however, be here observed, that in this region the Roots of the Anterior Nerves are found nearer the Anterior Mesial Furrow, whilst the Posterior are farther separated, because they correspond with the outer edges of the Posterior Columns, which are always thickest.

Fig. XVIII. Transverse Section of the same Spinal Marrow between the Roots of the Second Pair of Sacral Nerves.

The quantity of Grey Substance is always increased in proportion as the Medullary Substance diminishes, because the Anterior Columns become thinner as the nervous fibres are given off, as seen in the preceding figure.

XIX. Transverse Section of the Spinal Marrow through the Roots of the Fourth Pair of Lumbar Nerves.

Fig. XX to LII Are transverse Sections of the Spinal Marrow of a Cow.

Fig. XX. A Section below the Anterior Pyramids.

This appears to be the point from which the Spinal Marrow proceeds, and therefore no farther trace of Pyramid is observed. The diameter from before to behind is proportionably smaller than that from side to side. The Grey Substance is here found in greater quantity, and its Posterior Horns are elongated, and correspond to the Elevations of Grey Substance, which, in the human subject, separate the Anterior from the Posterior Columns. These Elevations however, in Quadrupeds are scarcely distinguishable externally. 1. *s. a.* Anterior Mesial Furrow. 2. *f. a.* Anterior Narrow Columns in the lower part of the Oblong Marrow, but which, at this height, are tolerably wide. 3. *s. l.* Posterior Lateral Grooves which incline imperceptibly from the Anterior to the Posterior Surface. 4. *f. p.* Posterior Columns, narrower than in the Oblong Marrow. 5. *l. a.* Very white lines or threads which come from the Anterior Horns of the Grey Substance. 6. *s. p.* Posterior Mesial Cervical Furrow.

Fig. XXI. Transverse Section of the Spinal Marrow of the Cow between the Roots of the Second Pair of Cervical Nerves.

The proportion between the Medullary and Grey Substance differs from that of the preceding figure. The latter is in smaller quantity, and its Posterior Horns are pointed and surrounded with a lighter Grey Substance. 1. *s. a.* Anterior Mesial Furrow in which a fold of the *T. Pia Mater* is inserted. 2. *f. a.* Very broad Anterior Columns. 3. *s. l.* Posterior Lateral Furrows. *f. p.* Narrow Posterior Columns. *s. p.* Posterior Mesial Furrow. *r. a.* Anterior Root of the First Pair of Nerves. *r. p.* Posterior Root. *n. a.* Accessory Nerve of Willis. *l. a.* Very white strips or threads which extend from the Anterior Horns of the Grey Substance.

Fig. XXII. Section of the Spinal Marrow between the Roots of the Third Pair of Cervical Nerves.

s. a.—*f. a.*—*s. l.*—*f. p.*—*s. p.*—*r. a.*—*r. p.*—*n. a.*—*l. a.* These letters indicate the same points shown in the preceding figure. The Posterior Horns of the Grey Substance are rather larger. In the Posterior Columns, traces of the Medullary Fibres of which they consist are observed.

Fig. XXIII. Section beneath the Roots of the Fourth Pair of Cervical Nerves.

Nothing is here very distinct: yet, on the sides are seen many rays of Grey Substance, which indicate the flattened structure of the Medullary Columns.

Fig. XXIV. Section between the Roots of the Fifth Pair of Cervical Nerves.

The Spinal Marrow is smaller and more cylindrical. It expands afterwards, as seen in the following sections. *x*. Small neighbouring furrows depending on the flat structure of the Spinal Marrow.

Fig. XXV. Section of the Spinal Marrow of a Cow between the Roots of the Sixth Pair of Cervical Nerves.

In this View, the Roots of the Accessory Nerves of Willis are so near to the Posterior Lateral Furrow, that they might be supposed to spring from the Posterior Columns. *x*. Accidental Furrows depending on the fibrous structure of the Spinal Marrow.

XXIV. Section between the Roots of the Seventh Pair of Cervical Nerves.

The Spinal Marrow is decidedly larger, narrower from before to behind, and wider from side to side. The Grey Substance is in larger quantity. At the extremities of its Posterior Horns is seen a patch of another Grey Substance of a deeper colour and albuminous nature, which has not been noticed by any Anatomist. It is of importance to observe that the edges of the Grey Substance are not throughout similar and smooth, as is usually stated in books, but, when closely examined, appear angular and toothed, depending on the minute growths of the Grey Substance which pass between the Fibrous Columns of the Anterior and Posterior Columns. *s. a.*—*c. a.*—*s. l.*—*f. p.*—*s. p.*—correspond with the preceding figures. *x*. Small accidental Furrows.

b. b. Very white Anterior and Posterior Stripes and Fibres. I have often seen these white fibres on pieces of the Spinal Marrow without any preparation. This can be easily made distinct by steeping in salt. As these Stripes correspond entirely to the Anterior Roots of the Dorsal Nerves, it may be supposed that they give rise to them. I therefore made every effort to satisfy myself that these are shoots of the Grey Substance penetrating between the Medullary Plates of the Anterior Columns.

These stripes were also formed by processes of the *T. Pia Mater,* which pass from the circumference towards the centre.

The very white streaks observed on the Posterior Columns cut the Posterior Grey Substance transversely, but are tortuous, like the Medullary Plates between which they pass. They do not correspond with the Posterior Roots of the Dorsal Nerves, but appear to arise from the windings which these parts undergo in their gradual development.

Fig. XXVII. Section between the Roots of the Third Pair of Cervical Nerves.

In consequence of what was said in the preceding figure, but little remains to be stated. The very white Anterior and Posterior Threads are very distinct. The roots *n. a.* of the Accessory Nerve remain near the Lateral Furrows. I would not, however, venture to maintain that they have arisen in the Posterior Columns. *a.* Numerous small accidental furrows, which run from the circumference to the centre, and depend on processes of the *T. Pia Mater* which penetrate between the Medullary Fibres.

Fig. XXVIII. Transverse Section of the Spinal Marrow of a Cow, between the Roots of the First Pair of Dorsal Nerves.

This part is nearer to the lower part of the Neck than the subjacent Back. The Grey Substance is found in pretty large quantity. The Anterior Horns are very much expanded, and exhibit angles by which the shoots from it into the Medullary Plates are rendered distinct. The very white Threads correspond in actual number to the Anterior Roots of the Dorsal Nerves. The Posterior Horns are surrounded by a layer of Grey Substance which is darker and sometimes about half a line thick. The very white Posterior Fibres cut through this substance, and often extend between the Fibres of the Posterior Columns. *r. a.* Anterior Roots of the numerous Dorsal Nerves. *r. p.* Posterior Roots of the Dorsal Nerves. These have their origins exclusively in the Posterior Columns. *x.* Accidental small Furrows.

Fig. XXIX. Transverse Section of the Spinal Marrow of a Cow between the Roots of the Second Pair of Dorsal Nerves.

The Spinal Marrow is here seen small and almost cylindrical as in the following parts. It is here worth remarking that the Posterior Columns are tolerably large.

The Grey Substance is in smaller quantity, and assumes throughout the whole Dorsal Region the form of a cross. The Anterior and Posterior Horns become equally delicate, and rest on a thin layer of darker Grey Substance.

Fig. XXX. Transverse Section between the Roots of the Fourth Pair of Nerves.

The Spinal Marrow is cylindrical. The very small Threads correspond to the smaller number of the Anterior Roots. The Posterior Horns have a thin under layer of a darker grey substance.

Fig. XXXI. Section of the Spinal Marrow of a Cow between the Roots of the Sixth Pair of Dorsal Nerves.

The Spinal Marrow is still cylindrical. On close examination, a great number of little threads and furrows are seen in this piece, passing from the circumference to the centre, which proceed from the fibrous structure of the Medullary Columns.

Fig. XXXII. Transverse Section of the same Spinal Marrow between the Roots of the Ninth Pair of Dorsal Nerves.

Fig. XXXIII. Transverse Section of the Spinal Marrow between the Roots of the Fourth Pair of Dorsal Nerves.

The Grey Substance has a somewhat different appearance. In this piece many little furrows are seen, of which some are elongations of the Grey Substance, and others extend from the circumference to the centre.

Fig. XXXIV. Section of the Spinal Marrow immediately above the Thirteenth Pair of Dorsal Nerves.

A slight difference is observed in the Grey Substance, and its Posterior Horns have an under layer of thin and darker Grey Substance.

Fig. XXXV. The same magnified.

Fig. XXXVI. Transverse Section of the Spinal Marrow immediately above the Second Pair of Lumbar Nerves.

The Spinal Marrow is more compressed before than behind, so long as it remains in the Dorsal Region, where it appears cylindrical. The Posterior Columns are broader, and the Grey Substance in larger quantity. *r.* Accidental small furrows or clefts.

Fig. XXXVII. Transverse Section of the Spinal Marrow immediate above the Second Pair of Lumbar Nerves.

The Grey Substance is found in larger quantity. The Anterior Horns are toothed. The White Threads, both Anterior and Posterior, are again seen. The former correspond to the Anterior Roots of the Dorsal Nerves; the latter cross through the toothed Posterior Horns, which are covered with a darker grey substance. *x.* Very many accidental small furrows and clefts, marking the separation between the Medullary Plates.

Fig. XXXIX. Transverse Section of the Spinal Marrow between the Roots of the Fifth Pair of Lumbar Nerves.

In this region the Spinal Marrow is more close, compressed in front, and rounded on its posterior surface, in consequence of the increased size of the Posterior Columns. The Grey Substance is also in greater quantity, and the elongations which penetrate between the Medullary Fibres are more distinct. Its Anterior Horns are broad, and the numerous white threads correspond, as I have already shown, to the Anterior Roots of the Dorsal Nerves. They are, therefore, depicted more curved inwards, because in this region the Anterior Roots are nearer the Mesial Furrow. The Grey Substance behind the Posterior Horns is darker and in larger quantity, and the small white fibres abundant.

Fig. XL. Section of the Spinal Marrow between the Roots of the Sixth Pair of Lumbar Nerves.

a. a. Anterior Mesial Furrow in which the *Arteria Spinalis Anterior* is situated. *r. a.* Anterior Roots of the Dorsal Nerves, which are always nearer to the Anterior Mesial Furrow. *l. a,* Very white Anterior Fibres. *f. a.* Posterior Columns. *r. p.* Posterior Roots arising from *f. p.* Posterior Columns which are much larger than in the Upper Region. The Grey Substance is abundant, and the white fibres in tolerable number. *x.* Accidental little furrows, caused by the elongation of the Grey Substance and *T. Pia Mater* which envelopes the Spinal Marrow.

Fig. XLI. Transverse Section of the Spinal Marrow between the Roots of the First Pair of Sacral Nerves.

Between these and the preceding, no distinct difference can be observed. I found one casual small furrow near the

Anterior Horns; and a second, passing from the circumference to the centre, was observed on the side.

Fig. XLII. Transverse Section corresponding to the Second Pair of Sacral Nerves.

The Spinal Marrow becomes narrower, but retains nearly the same proportions. The white Posterior Fibres are more numerous. The Anterior Roots approximate to the Anterior Mesial Furrow, whilst the Posterior are farther distant from the Mesial Line, in consequence of the thickness of the Posterior Columns.

Fig. XLIII. Section through the Spinal Marrow between the Roots of the Third Pair of Sacral Nerves.

The Grey Substance is more abundant in proportion than the Medullary. The darker substance is always seen on the Posterior Horns.

Fig. XLIV. Section between the Roots of the Fourth Pair of Sacral Nerves.

The Anterior Roots are always near the Anterior Mesial Furrow. The Anterior Horns of the Grey Substance are thinner than the Posterior.

Fig. XLV. Section between the Roots of the Fifth Pair of Sacral Nerves.

The Spinal Marrow becomes thinner.

Fig. XLVI. Section between the Roots of the First Pair of Coccygeal Nerves.

Fig. XLVII. Section between the Roots of the Second Pair of Coccygeal Nerves.

In the middle of the Grey Substance a small aperture is seen, which is very frequently found in Quadrupeds, and is a trace of the original tubular structure of the Spinal Marrow.

Fig. XLVIII. Section between the Roots of the Third Pair of Sacral Nerves.

The Grey is more abundant than the Medullary Substance. The Anterior Roots are near the Anterior Mesial Furrow.

Fig. XLIX. Section between the Roots of the Fourth Pair of Sacral Nerves.

The Spinal Marrow, which has been gradually diminishing from the Second Sacral Nerve, finally terminates in a Medullary Fibre.

Fig. L. Shows the upper surface of a transverse section of the Spinal Marrow of a Cow, between the Roots of the Sixth Pair of Cervical Nerves. This figure, which is double the natural size, was drawn by a very clever Artist, who was assisted in making out the several parts. *f. a.* Anterior Columns. *f. p.* Posterior Columns. *s.* Anterior Grey Substance spongy and vascular; and its irregular edges may be observed. *s. p.* Posterior Grey Substance which forms the Posterior Horn, and has an albuminous appearance and dark colour. *s. a.* Anterior Mesial Furrow, into which a fold of the *T. Pia Mater* passes, and renders it thereby more distinct than the Posterior. *s. p.* Posterior Mesial Furrow. *a.* Anterior Spinal Artery. *r. a.* Anterior Roots of the Dorsal Nerves slightly marked. *r. p.* Posterior Roots. *l. c.* Threads of Grey Substance which pass like rays from the centre to the circumference. These processes of the Grey Substance, noted and distinguished by a man who had no anatomical knowledge, shows that it is not so difficult to discover how the Spinal Marrow consists of plates between which these elongations of Grey Substance proceed; which leads us to the explanation of the nature and manner after which these parts must have been formed. *l. a.* Anterior White Threads, which correspond to the Anterior Roots of the Dorsal Nerves. *l. b.* Posterior White Threads, which correspond to the Posterior Roots of the Dorsal Nerves. *s. d.* Posterior Lateral Furrow which separates the Anterior from the Posterior Columns.

Fig. LI. Transverse Section of the Spinal Marrow between the Roots of the Sixth Pair of Nerves.

In making this preparation, a piece of Spinal Marrow must be steeped for some time in a solution of salt, and afterwards macerated fourteen or fifteen days in fresh water. It is important that the piece, thus prepared, should be cut through with a sharp scalpel: the cut surfaces, together with the numerous Medullary Plates and their processes from the inner and outer edges, can then be seen.

p. m. The *T. Pia Mater* which surrounds the Spinal Marrow, but is separated from it by maceration: from its inner surface, those fibrils pass which penetrate into the midst of the Medullary Folds. In order to prevent any confusion in the sketch, only some of the elongations of the *T. Pia Mater* are depicted. On close observation of this figure, which is magnified eight times, it is readily seen that the external columns are formed of a single lamina which begins at the bottom of the Anterior Furrow, and numerous folds distributed around the Grey Substance. The number of folds amounts to fifty in each Anterior Column. Particular attention must be paid to their position on the Anterior Mesial Furrow; and it should be observed that some of them reach only half the length of the others, as seen at the point. *x*. By attentive examination, it is also seen that the back of the Spinal Marrow is thicker at the circumference, and that it attenuates towards the centre.

From this figure, it is also shown how the radiated processes of the Grey Substance spread towards the circumference, and insinuate themselves between the Medullary Fibres. Lastly, I have depicted the figure of this scale, in order to follow the course of the Medullary Plates or Medullary tissue from the bottom of the Anterior Furrow to the Posterior Lateral Furrows. Such a process prevents any approximation of the Anterior Lateral Furrows.

r. a. Anterior Roots of the Dorsal Nerves. *r. p.* Posterior Roots of the Dorsal Nerves which arise entirely from the Posterior Columns. *s.* Grey Substance, entirely spongy and vascular, which differs as much as possible from the Grey Substance, as well as from *s. p.* the Posterior Grey Substance, which appears albuminous and of a deeper colour, and is connected in a peculiar way with the other by toothed processes somewhat similar to the sutures of the skull. *f. p.* Posterior Columns on which the same folds are observed, only more tortuous. *s. m. p.* Posterior Mesial Furrow less distinctly expressed, because fewer folds of the *T. Pia Mater,* which surrounds the whole Spinal Marrow, lie between it. A very small process, however, penetrates, very similar to those which insinuate themselves between the folds of the Medullary Fibrils. *l. a.* White Threads of the Posterior Horns which, as already observed, do not correspond to the Posterior Roots. *z.* At this part of the Posterior Columns, I have taken care to depict the vascular cellular tissue which surrounds the Medullary Fibres.

In order to preserve such a preparation, it is necessary to macerate it for a long time in the mode above mentioned.

Fig. LII. Shows a Transverse Section of a Piece of the Spinal Marrow of a Cow at the Origin of the Third Pair of Sacral Nerves.

This piece was prepared by softening in a solution of salt, and subsequent maceration.

f. a. Anterior Column formed of a Medullary Plate or Tissue, curved forwards and backwards. The number of the folds in this region begins to diminish, and I have occasionally counted only thirty in each column. *f.p.* Posterior Columns formed also of fibrils or small folds, which are very tortuous. *s.* Grey spongy and vascular substance. *s. p.* Posterior, almost albuminous, dark Grey Substance. *z.* Whitish Threads, the real Medullary Threads, which, at the bottom of the Anterior Mesial Furrow, connect the inner edges of the two Anterior Columns. This whitish striping is cellular. In all the figures, it is apparent that the two portions of the Grey Substance (the right and the left) are connected by a thread of similar structure. *s. l.* Posterior Lateral Furrows.

Fig. LIII. A Piece of the Spinal Marrow of the Tope, *Squalus Galeus,* magnified to double its natural Size, and viewed on its under Surface.

s. a. Anterior Furrow. *f. a.* Anterior Columns. *r. a.* Small apertures which, in fish, are found between the Anterior and Posterior Roots, from which a peculiar arrangement occurs, which leads me to suppose that the Nervous Roots proceed from the back of the Medullary Folds. *s.* Grey Substance surrounding a small cavity which, in fish, is found to extend along the whole length of the Spinal Marrow.

Fig. LIV. Upper View of the same Portion of the Spinal Marrow.

s. m. p. Posterior Mesial Furrow, in which are distinctly seen the Roots of the hinder or upper Dorsal Nerves.

When these parts are carefully observed, all the Posterior Roots of the Dorsal Nerves are seen coming from the Posterior Columns. It is also seen that the aforesaid roots are filaments, elongations of those threads which form the parallel Medullary Tissue of the Posterior and Anterior Columns.

f. a. Anterior, and in fishes very broad, Columns which form the Anterior Surface, Sides, and a part of the Posterior Surface of the Spinal Marrow.

Fig. LV. Cicatricula of an incubated Egg of *Fourteen Hours*, viewed beneath.

c. s. Disposition of the Brain and Spinal Marrow, consisting of two Medullary Threads, which are thicker in front. *a.* Fold of which the *Amnios* is formed, connected with the Common Integument, which yet invests the head. This fold has been already seen by many persons, without any one having been able to guess what this arrangement signified. *v.* First disposition to the formation of Veins which appears in the form of a vaulted net, from which often the smaller vessel going to the head is slightly convoluted, and becomes the place for the left Ventricle. *f.* Edges of the body of the Foetus. *a. p.* Transparent ring of the Area. *a. o.* Dusky ring of the Area, the tissue of which is spongy and vascular. Two zones are seen of which the inner is narrow, and the outer wide. *n.* The same protuberances of their natural size.

Fig. LVI. Protuberances of an Egg of *Sixteen Hours.*

c. s. Cerebro-Spinal position consisting of two symmetrical parts. *a.* Folds formed of skin, where it surrounds the head, in order to connect it with the *Amnios.* *f. p.* Posterior or upper diverging Columns, which sometimes increase in width in order to cover *f. a.* the already formed Anterior or Hinder Columns. *r. a.* Arterial Net in which the direction of the Arteries is observed, which hereafter form the *Arteriae Vitellinae.* All the rest of the transparent Area is a very delicate reticular tissue. *s.* Haller's Yolk-bag, which is very large: upon it the Foetus rests. *a. p.* Transparent Area. *a. o.* Dusky Area with two Zones. *n.* The same Cicatricula of their natural size.

Fig. LVII. Cicatricula of an Incubated Egg of *Thirty-three Hours,* viewed from above.

c. s. Cerebro-Spinal rudiment first exhibiting the type of leaves which are subsequently developed.

e. The Gullet, lying beneath the Cerebro-Spinal rudiment: it subsequently runs into *s*. the Yolk-bag, which is placed under *f*. the Foetus. *c.p*. Posterior or upper (still much diverging) Columns, but so placed that they soon form the Rhomboidal Sinus, *g*. Intervertebral Ganglions, connected on either side with the Posterior Columns. *p*. Membranous fold of the *Amnios*, which is connected with the skin covering the Foetus, and has loosened itself from the head. *v*. Veins which pass from the heart, and appear first under the form of a spongy Vascular Net. *a.p*.Transparent Area. *a.o*. Dusky Area in which two zones are seen, the outer of which is thinnest. *a. l*. Haloes, *halones,* formed of white and dark streaks found in the Yolk-bag, and seeming to wind around the Cicatricula, on account of the transparency of the Membrane which surrounds it.

Fig. LVIII. Embryon of an Incubated Egg at *Twenty-three Hours*.

c. Bulb or Cerebro-Spinal rudiment. It is here seen consisting of two symmetrical parts which are thicker in front, because the Cerebral Leaves begin to project. *g.c*. Intervertebral Ganglions, which are seven in number. *c. i*. Under Columns, which are seen in the middle, in the inter-furrow of *c. s*. the upper diverging Columns which, approximating, form the place for the Rhomboidal Sinus. *v*. First rudiment of the Veins, commonly formed of a tough net, which communicates with the heart beneath the Spinal Marrow in the form of a vertically extending vessel. *f*. Edges of the body of the Foetus, which are gradually formed. *a.p*. Transparent Area, which always appears netlike. *x*. Inner edges of the Dusky Area, which is here omitted.

Fig. LIX. Embryon of a Chick after *Forty-six Hours'* Incubation.

The development of the Embryon has, in proportion to others of the same age, proceeded but little. I have nevertheless chosen this figure, because it distinctly shows the Anterior Columns not entirely formed. *c. s.* Cerebro-Spinal Rudiment, the outer extremities of which show the rudiment of the Cerebral Leaves. *c. p.* Posterior or Upper Columns not yet completely formed, and reaching only to the end of the Spinal Marrow: they are, therefore, still diverging. This figure has some resemblance to that of Malpighi at *twenty-four* hours, in the XVII. figure of the 2nd Plate of the *Appendix repetitas auctasque de ovo incubato observationes continuis.* *c. a.* Anterior and inferior Columns already formed, but not yet entirely covered by the upper, as they are still imperfectly formed. *g. c.* Cardiac Ganglions, from which Nerves pass to the heart, lying in the perfectly formed Fowl behind the upper edge of the *Sternum.* *g. i.* Intervertebral Ganglions, which by Malpighi, Haller, Pander, and many other writers, are considered analogous to the Vertebrae: whilst these Ganglions are offsets from the Posterior Columns, which first become subsequently developed. *e. e.* Gullet. *v.* Veins coming from the heart; they are still very short, and terminate in a netlike tissue, which imperceptibly develops itself and first becomes visible. *f.* Foetus hardly developed; it consists, however, of a very fine spongy tissue, the netlike form of which, however, becomes distinct on the head. *a. p.* Transparent Area formed by a very delicate Vascular Net with large meshes on the head. *a. o.* Edge of the Dusky Area which has been omitted.

Fig. LX. Cicatricula of their natural size, containing the Embryon described in the last figure.

C. New Method of dissecting the Brain.*

The physiological object of my plan is to determine that the Nerves of Sensation and Motion are connected together in the Spinal Marrow as bundles, and in the Brain under the form of Membranes. As in every science, analytical must go hand in hand with synthetical proceedings, I here place the Brain in two sections, so that the upper part of the Brain lies below, and the interior is brought to the surface; and I then place it again together, so that nothing of the section can be observed. The Process is simple and easy. The Brain is laid on its convex surface (see the engraving) with its narrower extremity towards the dissector: the Middle Lobe, A, is then separated from the *Pedunculus cerebri,* and the scalpel carried between them: the section is then continued backwards through the *Fossa Sylvii* into the *Cavitas Digitata,* which lies at the bottom of the Posterior Lobe of the Brain: the cavity is thus opened, in which the lower part (*cornu descendens*) of the Lateral Ventricle, and the posterior extremity of its upper part (*cornu posterius*) are found. Here the two Middle Lobes are turned upon each other and backwards under the Cerebellum and *Pons,* which are raised upwards; care must be taken not to draw the Middle Lobes too much, by which the posterior Limbs of the *Fornix* would be torn. The Cerebellum and the *Pons* being meanwhile raised, a second incision is made into the lateral part of the Anterior Lobe *d.* beginning it behind and below the Optic Bed, and continuing forwards to the point of this lobe, although without dividing it; the whole, which formed the *Basis Cerebri,* and which filled the three cavities of the *Basis Cranii, e.* is then turned forwards. The Cerebral

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* According to *M. Laurencet* in the *Revue Medicale.*

Membrane or Substance which was previously folded five times, now forms only two similar halves; in order to realize this, the latter fold must not be separated at once, it, however, may be done on a tolerably firm brain; it must be separated by a section of the *Septum Lucidum*, and of the Anterior Limbs of the *Fornix*; the *Cornu Ammonis* is then loosened, and the whole turned back. The whole external surface of the Brain is then laid on the table, and the interior entirely exposed to view.

Thus laid out, the Cerebral Substance forms a very long Membrane, and exhibits on its Mesial Line, from before to behind, the following parts:—1. The *Medulla Oblongata*, A. and the Cerebellum A. 2. The *Corpora Quadrigemina* B. 3. The Third Ventricle formed by the separation of the Optic Beds C. 4. The Optic Beds themselves, large oval processes internally grey, externally white D. 5. After these follow the *Corpora Striata* E, bean-shaped eminences, the smaller extremity of which covers the *Thalamus Nervi Optici*; they are divided by the *Taenia Semicircularis* F. The *Corpora Striata* are processes of the Grey Substance of the convolutions of the Anterior Cerebral Notch, to which their thick extremity corresponds; they have the same colour and consistence, and finally the vessels which run upon their upper surface as red lines, belong to the *T. Pia Mater*. 6. The *Corpus Striatum* being removed by delicate slices, under it is found the continuation of the *Commissura Anterior*, which consists of the innermost fibres; these pass in a radiated form from the *thalamus*, penetrate it on both sides, and pass backwards till they reach the *Fossa Sylvii*, where they expand in the Membrane of the Middle Lobe, and partially form its connexion with the *pedunculus*. 7. In front of the Commissure, the Anterior Lobes of the *Corpus Trigonum* G. are seen, consisting of two small threads, two or three inches in length, which were connected with the *Corpus Trigonum* previous to the section; we shall come back to this immediately. 8. Behind them is the Anterior bend of the *Corpus Callosum* H. 9. Behind this bend is the Notch of the Anterior Cerebral Lobes. 10. After these are the *Corpus Callosum* with the *Septum Lucidum*, and covered with the *Fornix* or *Corpus Trigonum*; 11. behind which is the Notch of the Posterior Cerebral Lobes, K. Here the Membrane divides into two parts, and there is no broad Commissure in the Mesial Line.

On the lateral parts of the *Thalami Optici*, is found externally, a white stripe L, which is the origin of the Cerebral Membrane; when the *Corpus Striatum* has been sliced off, it is found to consist of Medullary rays which extend like a fan from the Optic Beds. 2. Another broad white surface M. which is situated on the middle of the *Corpus Trigonum;* this is the concave surface of the overlapping vault of the Hemispheres. 3. Opposite the Notch of the Cerebral Lobes, commences the hinder portion of the Cerebral Membrane N. which is increased by the Posterior Fibres of the fan. As the fibres pass longitudinally, they do not form a Commissure on the Mesial Line, and thus arises the Posterior Cleft of the Cerebral Lobes: as the margins of this cleft Membrane do not touch, they contract a little, become convoluted, and so form the Fringed Bodies *n*. At the point corresponding to the Posterior Lobes, the two portions of the Cleft Membrane are turned from without inwards, in consequence of which, the Posterior Lobes *b*, and the *Cavitas digitata* are formed, O. Finally, each portion of them bends round on itself, and converges with that of the other side. Rather before the Posterior Cerebral Cleft, these converging leaves meet together, in order to form the *Corpus Trigonum*, P, which arises in the following manner: — the Membrane presents, at its extremities, two four-sided bands: a diagonal line, which passes from the external angle, divides it into four right-angled triangles; the two external remain horizontal, and form, together, the *Corpus Callosum* or *Fornix;* the two internal rise vertically, join together, and thus form the double *Septum Lucidum,* which is so connected with the *Corpus Callosum* that the fibres of the right partition unite and turn over to those of the Left Hemisphere: there is, therefore, a decussation of the Posterior as well as of the Anterior Nerves. The latter, indeed, does not affect that portion of the Cleft Membrane which conveys the energy of the Cerebrum to the Cerebellum, but this latter organ has, likewise, the effect of a decussation by means of its Commissure, which is connected with the Anterior Pyramids above their decussation.

Where the *Corpus Trigonum* terminates, the Membrane runs into two small threads two or three lines long, these are the Anterior Limbs: they divide into two portions: the inferior, Q, descends, covered by a layer of Grey Substance, from the *Thalamus,* which lies on its Inner Wall, to the *Tuberculum Mammillare,* R, and then again at no great depth on the interior of the *Thalamus* ascends to S, where it is connected with the *Stria Cornea,* T. It is difficult to determine whether a bundle from the *Eminentia Mammillaris* does not convey itself from its entrance into the *Pons,* in order to unite itself with that of the opposite side to each fibrous triangular surface, which fills the angular part of the peduncle, and certainly does not belong to it, as it is divided from it by a distinct furrow.

The Upper part again divides into two portions which turn upwards and backwards from the *Thalamus Nervi Optici,* and form the following parts; the first inner portion forms a small stripe, V, which passes to the edge of the surface of the *Thalamus,* looking towards the Ventricle: from its connexion with that of the other side behind the Third Ventricle, arises the Posterior Commissure, U, of the latter, upon which the *Glandula Pinealis* lies; beneath it is the opening of the *Aquaeductus Sylvii;* in some Beasts, the Anterior Pair of the *Corpora Quadrigemina* also arise from these stripes. The second or external portion, forms the *Taenia Semicircularis,* T, which passes at the base of the *Corpus Striatum,* and winds backwards and outwards around the *Thalamus,* thence again comes forwards with that of the opposite side, in order to produce the Posterior Pair of Quadrigeminal Bodies. This pair is evidently whiter than the other and fibrous: moreover if this were otherwise, how would the *Nervi Optici* and *Pathetici* communicate with the Brain. The *Corpora Quadrigemina* cover the *Aquaeductus Sylvii* and then divide into two bundles bounding this canal, which is now covered by the *Valvula Vieussenii* extending from one bundle to the other to the *Ventriculus quartus,* Y. This Ventricle merely arises from the expansion of the aforesaid canal, as the bundles coming from the *Corpora Quadrigemina* separate from each other, and expand into a Membrane which consists of an external layer of Grey Substance, and an internal of White Substance. From these folds the Cerebellum itself arises. This Membrane is arched from above downwards, so that its upper and lower extremity meet together upon the surface of the Fourth Ventricle; these are the two *Processus Vermiformes.* The two extremities of the transverse axes are likewise united circularly like a ring upon the *Pons Varolii,* and one part extends upon the *Medulla Oblongata* as far as the *Corpus Olivare* and ends in the furrow which separates the Anterior from the Posterior Pyramids. These latter are nothing more than a portion of the fibres which become enlarged in the

Cerebellum, and instead of bending round the *Pons*, descend as the margins of the *Calamus Scriptorius* in order to unite with the Posterior Columns of the Spinal Cord; beyond the *Calamus* which arises from their deviation, they meet in the Mesial Plane.

By thus treating the Brain, it is proved that the Membrane, broad at first, gradually diminishes till it is lost in the Columns, and not as some would have it, that the *Fornix* springs from the *Eminentiae Mammillares* and the *Corpora Quadrigemina.* To the latter, the *Lyre* also corresponds: if the *Fornix* passed from before backwards, so would it follow a diverging disposition on the Posterior Limbs, and the folds would consequently be drawn apart from each other; this arises rather from the diverging tendency, as the external fibres run over the internal fibres towards the Mesial Furrow. It must be observed, that the Convolutions of the Middle Lobes diminish up to the Posterior Limbs, where they entirely cease: at the same time the Grey Substance is entirely deficient, whilst in the Convolutions of the Anterior Cleft of the Cerebrum it was in excess, and produced the *Corpus Striatum.*

It is seen, therefore, that all these differently formed parts can be traced back to the form of Column or Membrane and to the Grey or Medullary Substance. These parts receive their character from that portion of the Nervous System on which they occur, and not from their shape.

As the Cavities of the Brain are merely the interior of the Convolutions, they must disappear in our unfolding of the Brain; they can, however, be again restored by replacement of all the parts. The *Thalami, Corpora Striata,* and *Ventriculus Tertius* then rest upon the *Trigonum;* the cavities within the convolutions form the *Ventriculi Laterales;* replace then the cut edges of the *Fossae Sylvii* upon each other, and the double leaf is restored, which includes the *Cavitas Digitata* ; then placing the Middle Lobes again upon the *Pedunculi,* the previously expanded folds of the *Trigonum* relax, and again stand vertically beneath the horizontal *Trigonum.*

As the same folding occurs also in the length of the divided Membrane of the hinder part (*membranes bifurquées*), there is a cleft, towards which, in its natural state, the Posterior Surface of the *Pons Varolii* inclines, whereby the Oval Fissure of *Bichat* is produced.

All authors say, that the Anterior as well as the Posterior Pyramids ascend to the Cerebrum ; I, however, say that the latter descend from the Cerebrum ; even *Tiedemann* overlooks this, although his work gives proof of it ; for, according to his account, the *Trigonum* and the Cerebellum are formed later than the base of the Cerebrum. From all this, it appears that the Nervous Apparatus forms a loop, the extremity of which is connected with the Anterior and Posterior Nervous Columns. As one of these Columns forms the Apparatus of Sensation, and the other that of Motion, so must that be the centre of the whole Nervous System where these two Apparatus meet together. Although the fibres of the *Corpus Callosum* and its Anterior Curve have a different direction, still, however, there exists for it that loop by means of the walls of the *Septum Lucidum* which appears to be constructed in order to receive the collected fibres of the concavities of the Hemispheres.*

This anatomical exposition will agree with the propositions laid down by *Bell,* and confirmed by the experiments of *Magendie,* with respect to the properties of the Anterior and Posterior Columns of the Spinal Marrow, by which the former are conductors of Motion, and the latter of Sensation. It seemed to me here more satisfactory to proceed from anatomical facts. It becomes the question, how Motion and Sensation pass from and to the Brain; whether they are produced at the same time, or whether they are consequent to each other, or whether, finally, the one is not the cause of the other. However that may be, still there remains the difficulty to determine, how the four Columns of the Spinal Marrow, which run parallel to each other, are connected with the Brain, where their development is more considerable. We therefore also pursued the Columns from the decussation of the Pyramids to their membranous expansion, above the *Thalami Nervorum Opticorum,* and we perceived that two enlargements, viz. the Cerebrum and Cerebellum, represented the Nervous centre. The Cerebrum is produced by the expansion of the anterior Nerves into a net; the Cerebellum, in like manner, arises from the posterior Nerves by a membranous net. These two arrangements of the Nerves are connected by an Anastomosis, which takes place between the *Septum Lucidum,* the *Cornu Ammonis,* the *Corpus Callosum,* and the Posterior and Anterior curvings of this Commissure: the point of connexion of these parts is seen at the *Raphe;* the fibres of one system projecting into those of the other. If we take but a slight view of the previous development of the Brain, we find that the expansion of the Anterior Pyramids, by their stretching under the Optic Beds, forms a fan in the direction from within outwards; the fibres soon spread in every direction from without inwards, but always in their peculiar sloping transverse and longitudinal direction. In this manner, they become concentrated in the *Corpus Callosum* and its curves. As this fan is very much compressed by the aforesaid convergence, it occupies a surface proportionate to the much smaller fans of the Posterior Nerves: this last has its base in the anterior pillar of the *Fornix*, and its extremity in the *Septum Lucidum* and *Cornu Ammonis*. Its fibres also diverge in three directions, and rest on the corresponding fibres of the Anterior Nerves. The continuation lies in the *Septum Lucidum*, which is crossed by the fibres of the Hemispheres; this decussation is distinct at the posterior knee of the *Corpus Callosum* (S. 1. Fig.). Although I say that the anterior and posterior Nerves meet together with the *Septum Lucidum* at the *Corpus Callosum*; it does not necessarily follow that in injuries of the Brain all the parts posterior to this point must exclusively afford changes of Sensation, and all before it changes of Motion. The Anterior Fibres can expand and return themselves from the *Thalami* to the *Corpus Restiforme*, the fibres of which are connected with the Posterior Nerves. The point of their anastomosis produces no boundary, no *raphe*; it is rather a circle without beginning or ending. The decussation by no means prevents the continuity: the parts, formed by the process of the posterior Nerves, viz. the *Septum Lucidum* and the *Cornu Ammonis* are indeed vertical, whilst all above the decussation are horizontal; but this relative position which originates in the folding of the Membrane, must vanish, if the net just mentioned can be separated at its anterior and posterior extremities: two similar truncated cones would then appear connected at their inferior surface, and their fibres might be followed from the point of one to that of the other without rupture, and there would then only remain a decussation at that point at which the fibres of the Hemispheres pass into the Commissure of the *Corpus Cal-*

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* I shall subsequently show that nine of the twelve Cerebral Nerves derive their roots from both the Systems which form the loop, whilst three derive them exclusively from one of the Systems.

losum. The Third Figure exhibits the Nervous Apparatus so expanded and laid out; the Second Figure shows the two systems of the Anterior and Posterior Nerves re-applied in their natural parallel. The two outer Columns of the Second Plate, *a, b,* (also in the Third) are the Anterior Columns, or those of Motion; their decussation at *b,* corresponds to that of the Pyramids; the two following spaces *cc,* and *dd,* the expansion of the fibres of the Pyramids in the *Pons* and *Corpus Striatum;* the surface *ee* answers to the Cerebral Membrane of the Hemispheres. The point *ff.* corresponds to the decussation of the *Corpus Callosum;* the space of the Net, *gg,* which in the Third Figure follows the decussation *f,* but in the Second lies under it, answers to the *Septum Lucidum,* the *Cornu Ammonis,* the *Fornix,* and even the Cerebellum, which, for the sake of distinctness, has been removed. The two inner Columns in the Second Figure, *hi,* which do not cross, are the Posterior Columns; the fibres on both sides are the Dorsal Nerves, with an anterior Motive and a posterior Sensitive Fibre. It is also seen, that the Nervous System is in pairs, and that each half forms a circle, which cuts the other, and that, lastly, each circle consists of two parallel ellipses, one of which is formed by the Motive, and the other by the Sensitive Nerves.

Besides this large Anastomosis of loops, there is still an inferior one between the Nerves of Sensation and Motion, viz. the connection of the Cerebellum with the Anterior Nerves by its Commissure in the *Pons Varolii.* This Commissure is a real mingling of the fibres of the Cerebellum with those of the Pyramids. At first it is not distinct; but the more the Pyramids separate from each other beneath the *Pons,* the more distinctly does the Limb of the Cerebellum appear embedded in the Pyramid. It remains undecided, whether there exists, here, merely contiguity or actual continuity between the fibres; but it is certain that the Cerebellum influences Motion through the medium of the Anterior Pyramids, and analogy teaches that the power of conducting depends on continuity, and not on mere contact. The Cerebellum also forms, beneath the first, a second chain. The whole complicated structure of the Brain admits of being traced back to one simple chain. This continuity depends on the apparently separated parts: the connexion of the *Fornix,* with respect to its Anterior Pillars and the parts springing from it, had not yet been distinctly demonstrated with the *Corpora Quadrigemina,* and the connexion of these with the Cerebellum; the Posterior Commissure of the Third Ventricle, is considered as the *Pedunculus ad Glandem Pinealem,* and their traces are lost on the *Thalamus,* whilst, however, they are the inner portion of the finer Net on the *Thalamus;* this Net has not yet been described by any one, and although in man it is very delicate, yet the one stripe on the expanded surface of the *Thalamus,* and the other proceeding along the base of the *Corpus Striatum* are constantly distinct: it is not supposed that all these are appendages of the Anterior Pillar of the *Fornix*; it is believed, that one part of this pillar passes into the *Corpus candicans s. Mammillare,* and is lost in the interior of the *Thalamus,* although it may be again traced to the *Taenia;* lastly, it occupies the whole spaces between the Lateral Bundles of the *Valvula Cerebelli,* and the pyramidal part of the *Pedunculus Cerebri.* In Beasts, all these parts are very distinct and exhibit a fibrous structure. Assume we now, that the Nervous Activity depends on a fluid analogous to the electric fluid, so can these parts, in spite of their delicacy as conductors, perform as important an office as the Hemispheres themselves.

Such being the state of the loops discovered by me, they correspond to those discovered by *Dumas* and *Prevost,* who form the Nerves which proceed from the external Columns (*ab.*) with those from the internal (*hi.*). I have proved, by ocular inspection and by close examination, for the upper part of the Nervous Apparatus, what those two Anatomists have shown by microscopic observation for the lower part of that Apparatus.

THIRTY-FOURTH PLATE.

Nerves of the Head and Neck.

Fig. 1. A general View of the Nerves of the Face and Neck. The soft parts are here removed, because their expansion would be inconvenient from the multiplication of outline in this slight sketch; and the Nerves appear therefore entirely in their natural course, as it were, shining through the soft parts, and disproportioned to the bony structure with which they are surrounded.

A. Nervus facialis seu N. respiratorius faciei, Bell. *a.* Ascending Branches to the Temples. *b.* Twigs to the Eyelids. *c.* Twigs to the Nose. *d.* Descending Branches to the Lower Jaw and Neck. *c. Plexus cervicalis superficialis. f. f.* Anastomosis with the Cervical Nerves. *g. Ramus auricularis* to the Posterior Muscles of the Ear. *B. Nervus vagus. C. Nervus accessorius Willissii seu N. respiratorius superior,* Bell. *D. Nervus hypoglossus. E. Nervus phrenicus. F. Nervus sympathicus maximus. G. Ramus laryngeus superior Nervi vagi. H. R. laryngeus inferior seu recurrens N. vagi. I. Nervus glossopharyngeus.*

I. Ramus frontalis rami primi Nervi trigemini. II. Ramus infraorbitalis rami secundi N. trigemini. III. Ramus alveolaris inferior rami tertii N. trigemini. IV. Ramus auricularis anterior seu temporalis rami tertii N. trigemini. V. Ramus buccalis labialis rami tertii N. trigemini. VI. VII. VIII. IX. Nervi cervicales.

Fig II. The superficial Facial Nerves are here cut through and turned back, and the course of the Nerves from the Third Branch of the Fifth Pair to the Muscles of the Jaw shown.

a. b. c. Nervus facialis, cut through and turned aside. *d. Ramus massetericus N. trigemini.* The *Musculus Masseter* is here separated from the Lower Jaw, and drawn back in order to see this Nerve. *e. Ramus buccinalis labialis,* which expands upon the *M. M. buccinatorius, levator labiorum et orbicularis oris. f. Ramus mylohyoideus rami tertii Nervi trigemini,* which expands in the Muscles depressing the Lower Jaw. *g. Nervus infraorbitalis. h. N. alveolaris inferior seu mandibulo-labralis* Bell. *i. Ramus nasalis externus s. lateralis,* which comes out of the orbit.*

Nerves of the Neck,

According to Scarpa.

Fig. III. *a. Musculus mylohyoideus. b.* ***M****. stylohyoideus. c. M. digastrius maxillae inferioris. d. M, sterno-cleido-mastoideus. e. M. omohyoideus. f. Vena jugularis interna. g. Arteria carotis communis.*

1. *Nervus accessorius Willissii.* 2. *N. hypoglossus.* 3. *Ramus descendens N. hypoglossi.* 4. 5. 6. 7. *N. cervicalis.* II. III. IV. *et* V. 8. 9. *Rami communicantes* with the *Ramus descendens N. hypoglossi.* 10. *N. phrenicus* 11. *R. lingualis N. trigemini.*

Fig. IV. 1. *Nervus facialis.* 2. *Ramus superior et* 3. *inferior.* 4. *Plexus anserinus N. facialis.* 5. *R. digastricus et* 6. *stylohyoideus.* 7. *N. accessorius.* 8. *N. hypoglossus.* 9. *N. glossopharyngeus.* 10. *Ramus pharyngeus. N. vagi.* 11. *Plexus pharyngeus N. glossopharyngei et R. pharyngei N. vagi.* 12. *R. linguales N. glossopharyn-*

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* Fig. I. II. V. VI. and VII. are from C. Bell; *The Nervous System of the Human Body.* London, 1830.

gei. 13. *Rami pharyngei N. glossopharyngei.* 14. *Rami carotidis internae N. glossopharyngei.* 15. *Plexus carotideus N. glossopharyngei et Ramus laryngeus superior. N. vagi.* 16. *Ramus laryngeus superior N. vagi.* 16ª. *R. externus R. laryngei superioris N. vagi.* 17. *N. vagus.* 18. *Ganglion supremum N. sympathici maximi.* 19. *Rami molles N. sympathici maximi.* 20. *Rami cardiaci superficiales N. sympathici.* 21. *N. sympathicus.* 22. *N. cervicales.* 23. *N. phrenicus.*

Fig. VI. *a.* Perpendicular Section of the Cerebral Cavity. *b. Medulla oblongata.* *c. Medulla spinalis.* *d. Lingua.* *e. Larynx.* *f. Bronchiae.* *g. h. Oesophagus et ventriculus.* *i. Diaphragma.* 1. *Nervus vagus.* 2. *Ramus laryngeus superior.* 3. *Inferior N. vagi.* 4. *Plexus pulmonalis N. vagi.* 5. *Plexus cardiacus N. vagi.* 6. *Plexus cardiacus N. vagi.* 7. *Origo N. trochlearis.* 8. *Origo N. facialis.* 9. *Origo N. glossopharyngei.* 10. *Origo N. accessorii Willissii.* 11. *N. accessorius Wilissii,* where it penetrates the *Musculus sterno-cleido-mastoideus.* 12. *Origo Nervi phrenici seu respiratorii interni.* 13. *Origo Nervi respiratorii externi.*

Fig. VII. View of the Origins of the Cerebral Nerves from the *Medulla oblongata.*

1. *N. optici.* 2. *N. oculomotorii.* 3. *N. trochleares.* 4. *Portio major s. posterior N. trigemini.* 5. *Ganglion Gasserii.* 6. *Portio minor.* 7. *Ramus primas seu ophthalmicus.* 8. *Ramus secundus seu maxillares superior.* 9. *Ramus tertius seu maxillaris inferior Nervi trigemini.* The *Portio minor* runs entirely into this Branch. 10. *N. abducentes.* 11. *N. facialis.* 12. *N. acusticus.* 13. *N. glossopharyngeus.* 14. *N. vagus.* 15. 16. *N. accessorius Willissii.* 17. *N. hypoglossus.* 18. *N. cervicalis primus.* 19. *N. cervicalis secundus.*

Fig. VIII.* Portion of the Spinal Marrow from which the 3rd and 4th *Nervus cervicalis* arise.

III. *N. cervicalis tertius*, IV. *quartus*, V. *quintus.*—*a. Medulla spinalis.* *b.* Posterior Root of the 3rd Cervical Nerve, consisting of five thick threads, and running into the *Ganglion spinale.* *c.* Anterior Root of the 3rd Cervical Nerve, consisting of three thin flat bundles of pointed fibres. *d. d. N. accessorius,* passing out from between the two roots of the 3rd and 4th Cervical Nerves. *e.* Posterior Root of the 4th Cervical Nerve, consisting of two thick bundles, of which the upper gives a connecting fibre to the Posterior Root of the Third Cervical Nerve. They form the *Ganglion spinale,* from which proceed *f.* one ***Ramus** cutaneus cervicis*, and *g.* one ***R.** muscularis* of the ***M.** scalenus.* *h.* Anterior Root of the 4th Cervical Nerve. An upper thread is observed on it arising by three fibres from the Spinal Marrow; it then receives a connecting branch from the under thread, runs to the *Ganglion spinale,* and passing over it, may be traced distinctly with one deep branch on the outer side of the *Ganglion* as far as *g*, but with the other superficial branch, forms one (the upper and thickest) root *i.* of the *N. phrenicus.* There is also seen an inferior thread of the Anterior Root, which runs directly into the *N. phrenicus* as the lower root of that nerve *k.* Between these two roots of the *N. phrenicus* (*i. k.*) are seen four delicate Nervous Threads, which come from the mass of the *Ganglion spinale.* *l. l.* The thus produced trunk of the *N. phrenicus* is still connected with the *N. cervicalis*, and then descends.

Fig. IX.† A portion of the Spinal Marrow in the Lumbar Region with the origin of the *N. sympathicus,* and of the Second Lumbar Nerve at this part.

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* N. B. In the Plate this Figure is marked IX.

† N. B. In the Plate this Figure is marked VIII.

a. a. Spinal Marrow seen from behind. *b. b.* Two threads of the Posterior Root of the 2nd Lumbar Nerve. *c. Ganglion spinale,* formed by it. *d. Ramus muscularis dorsalis* of the 2nd Lumbar Nerve. *e. R. anterior* of the same Nerve (*Ramus ileo-inguinalis*), *f. f.* A portion of the *Pars lumbalis* of the *N. sympathicus. g. Ganglion lumbale primum, h. secundum, i. tertium,* of the same Nerves. 1. 2, 3, 4, Four distinct threads of the Anterior Root of the 2nd Lumbar Nerve. 1. The upper thread passes outwards, and going to the *Ganglion* it partly forms the Branch *d.* and *c.* The threads 2 and 3 are connected together in their course, but again separate from each other, so that the thread 2 passes into the trunk of the Nerve *e,* which is formed by the Nervous bundle from the *Ganglion c.* and from the Thread 1, but the Thread 3 passes into the *Nervus sympathicus.* The Thread 4 passes by itself and runs into the *N. sympathicus. k.* Connecting fibres between the Second Lumbar Nerve and the *N. sympathicus.* It divides into two branches *l.* and *m. l.* The upper branch gives off a twig to the Nerve *e,* and then runs into the third fibre of the Anterior Root of the Second Lumbar Nerve. *m.* The under branch divides into four twigs, of which the Anterior one runs into the Nerve *e,* after that it has become connected with the preceding branch I at *n;* two others sink into the *Ganglion spinale,* and the fourth alone to the Thread 4 of the Anterior Root of the Second Lumbar Nerve.

Fig. X. Cranial and Spinal Cavity of an Ox, in which are seen the Quadrigeminal Bodies on the *Medulla Oblongata,* and the *Medulla Spinalis* as far as the Second Cervical Nerve.

a. a. Cranial Cavity opened. *b. Nervus opticus,* cut through at the *Chiasma*. *c. d. Corpora quadrigemina. e. N. patheticus. f. Crus cerebelli ad pontem. g. N. quintus. h. N. facialis. i. N. auditorius. k. Ganglion nervi auditorii. l. Ventriculus quartus. m. N. glossopharyngeus. n. N. vagus. o. R. spinalis nervi vagi. p. p. p. N. accessorius. q. q. Ramus spinalis minor nervi accessorii.* It arises below the Second Cervical Nerve, has five roots from the Spinal Marrow, is connected with the principal trunk of the *N. accessorius* with one branch below and with two branches above the Ganglion *n*, and, running at the posterior margin of the *N. accessorius*, enters the *Foramen jugulare.* *r. r^1. r^2. Ganglion radicis posterioris nervi hypoglossi.* It arises by two roots r^1, is grey, about the size of a lentil, and surrounds the *N. accessorius*, without becoming connected with its Nervous mass. The thick round branch r^2 arising from it, passes through a round opening in the *Ligamentum dentatum* (to be seen at *t*) passes through the trunk of the *Nervus accessorius*, and connects itself with the posterior twig *s* of the Anterior Root of the *N. hypoglossus*. s^1. *s*. Posterior and Anterior Twig of the Anterior Root of the *Nervus hypoglossus. t. t. t. Ligamentum dentatum, u. Nervus cervicalis primus et v. secundus. x. x. Dura Mater* of Spinal Marrow opened and turned back,*

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*Fig. VIII, IX and X, are from *Mayer: Ueber das Gehirn, das Rückenmark und die Nerven. Eine anatomisch-physiologische Untersuchung von Prof. Mayer zu Bonn, in Acta Acad. Caes. Leop. Carol. Nat. Cur. Vol. XVI. p.* 11.

THIRTY-FIFTH PLATE.

Lymphatic Vessels.

Fig. I. General Distribution of the Lymphatic Vessels.* This Body exhibits first the Lymphatic Vessels on the Extremities immediately beneath the skin. The deeper Lymphatic Vessels are easily distinguished from them by dark lines, whilst the former Superficial are dotted. In the Belly are seen the commencement and junction of the *Ductus thoracicus:* also the Lymphatic Vessels of the Left Kidney, the Stomach, and the Liver. In the Chest are seen the *Vasa lymphatica* of the Lungs and Heart. On the Neck also are several Lymphatic Vessels; and lastly, the Trunks, which both on the right and left side of the Neck, terminate in the Venous System between the *Vena jugularis* and *subclavia.*

Fig. II. Shows the Course of the proper Lymphatic Trunk, and its Termination in the *Venae subclaviae.*

A. Columna vertebralis. B. Costae dextrae a prima ad duodecim. C. Costae sinistrae tres superiores. D. Scapulae dextrae et E. Scapulae sinistrae facies interna. F. Cordis ex situ remoti et sinistrorsum versi facies inferior. G. Arterior pulmonalis, ex eadem prodiens. H. Aorta pone Arteriam pulmonalem emergens. I. Truncus anonymus. K. Arteria subclavia dextra. L. A. carotis dextra. M. A. carotis sinistra. N. A. subclavia sinistra. O. Aorta descendens thoracica. P. Vena cava superior. Q. Vena subclavia dextra. R. Vena jugularis dextra

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* From Cruikshank *Anatomy of the Absorbent Vessels of the Human Body.*

interna. *S. Eadem externa.* *T. Vena subclavia sinistra.* *U. Vena cephalica.* *V. Venae jugularis sinistrae recissae initium.* *W. Vena azygos.* X. *Oesophagus.* *Y. Larynx et trachea.* I. The *Ductus thoracicus,* wide at its origin, and forming many nets and plexuses, and at II. after it has received the Lymphatic Vessels of the Neck and left upper extremity, it empties itself at the angle formed by the junction of the *Vena jugularis sinistra et axillaris,* into the *Vena subclavia sinistra.* III. Passage formed by the Lymphatic Vessels and Glands of the *axilla.* IV. V. Two trunks which are formed by the Lymphatic Vessels of the Head and Arm of the right side, and which open into the *Vena subclavia dextra.* VI. The part of the *Ductus thoracicus,* which, in the larger Figure, is covered by the parts lying thereon.

Fig. III. IV. V. VI. VII. Lymphatic Vessels and Lymphatic Glands exhibited particularly and on both sides.*

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* These Figures, as also Fig. II., are from *J. F. Meckel, d. a. Samueli Thomae Soemmerringio anatomico et physiologico celeberrimo die VII. Aprilis post gradum doctoris medicinae et chirurgiae rite captum felicissimae et in summum scientiae emolumentum peracti celebranti pia mente gratulatur Johannes Fridericus Meckelius. Accedunt tabulae aeneae VI. Halle* 1818 *Lipsiae prostat apud Voss et officina Hirschfeldii.*

THIRTY-SIXTH PLATE.*

Fig. I. Shows the Thoracic Portion of the Aorta.

1. *Trachea*. 2. 2. *Bronchi*. 3. *Oesophagus*. 4. *Valvulae semilunares aortae*. 5. *Origo arteriae coronariae cordis dextrae et* 6. *sinistrae*. 7. *Aorta ascendens*. 8. *Arcus aortae*. 9. *Truncus anonymus*. 10. *Arteria subclavia dextra*. 11. *A. carotis dextra*. 12. *A. carotis sinistra*. 13. *A. subclavia sinistra*. 14. *A. bronchialis dextra et* 15. *sinistra*. 16. *Aorta descendens*. 17. *Arteriae oesophageae*. 18. *Arteriae intercostales inferiores seu aorticae*. 19. *Rami posteriores seu dorsales*. 20. *Rami costales inferiores et* 21. *superiores*. 22. *Aorta abdominalis*. 23. *A. coelica*. 24. *Truncus arteriarum diaphragmaticarum inferiorum*.

Fig. II. Shows the Internal Mammary, and Superior Intercostal Artery, looking up from the cavity of the Chest.

1. Sixth, 2. Seventh Cervical Vertebra. 3. 4. 5. 6. Upper Dorsal Vertebrae. 7. Clavicle. 8. First, 9. second, 10. Third Rib. 11. Breastbone. 12. *Arteria subclavia*. 13. *A. mammaria interna*. 14. Twig which passes out of the Chest over the Clavicle. 15. *Ramuli sternales*. 16. *Rami intercostales*. 17. External Thoracic Branches which penetrate the Intercostal Muscles. 18. Intercostal Branches connected with the true Intercostal Arteries. 19. Trunk of the Deep Cervical and Superior Intercostal

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* From *Tiedemann*. *Tab. arteriarum*.

Arteries from the *A. subclavia.* 20. *A. cervicalis profunda.* 21. *A. intercostalis suprema.* 22. *Rami dorsales.* 23. *A. intercostalis prima.* 24. *Ramus superior et inferior.* 25. *A. intercostalis secunda.* 26. *R. superior et inferior.* 27. *A. intercostalis tertia et* 28. *quarta,* which arise from the *Aorta thoracica.* 29. *A. Vertebralis.*

Fig. III. and IV.

Shows the course of the Inferior Epigastric Artery on the Body of a Man which had on the right an Oblique, and on the left a Direct Inguinal Hernia.

Fig. III. Shows the Hernia externally.

On the right side is the Oblique, and on the left the Direct Hernia.

1. The expanded Abdominal Ring, *annulus abdominalis expansus.* 2. The *Scrotum* cut through, *scrotum incisum.* 3. General covering with the Muscle of the Testicle, *tunica vaginalis communis cum M. cremastere.* 4. *Peritoneum* opened, which forms the Hernial Sack, *peritoneum saccum herniae constituens apertum.* 5. Protruded portion of the Small Intestine, *portio intestini tenuis.* 6. *Arteria Vena et Nervus cruralis.* 7. *A. epigastrica inferior profunda* lying posterior to the Hernia. 8. Course of this Artery towards the Navel. 9. *A. circumflexa ilei interna.*

Fig. IV. Exhibits this Hernia, as seen from the Cavity of the Belly.

1. Expanded entrance of the Inguinal Canal or Internal Abdominal Ring, by which the Oblique Hernia passes out. 2. Aperture for Direct Hernia, produced by a rupture of the tendons of the *M. transversus* and *obliquus internus abdominis,* which point is called the *fossa inguinalis.* 3. *Peritoneum* forming the Hernial Sack. 4. Entrance to the Cavity of the Hernial Sack. 5. *Vas deferens.* 6.

Urinary Bladder. 7. *Rectum.* 8. *Aorta abdominalis.* 9. *A. iliacae communes.* 10. *A. sacralis media.* 11. *A. crurales.* 12. *A. hypogastrica.* 13. *A. obturatoriae.* 14. *A. spermaticae internae.* 15. *A. epigastrica inferior profunda dextri lateris* passing behind the Sack of Oblique Hernia. 16. *A. epigastrica inferior profunda sinistri lateris,* which passes on the outward anterior edge of Direct Hernia. 17. *A. circumflexa ilei interna.* 18. *Venae spermaticae.*